Service Manual

Outdoor Unit Series
Trane TVR™ II DC Inverter VRF System

Model Numbers	4TVH0086AD	4TVH0182AD	4TVH0327AD	4TVH0492AD
	4TVH0096AD	4TVH0192AD	4TVH0347AD	4TVH0502AD
	4TVH0115AD	4TVH0211AD	4TVH0366AD	4TVH0521AD
	4TVH0135AD	4TVH0231AD	4TVH0386AD	4TVH0541AD
	4TVH0155AD	4TVH0251AD	4TVH0405AD	4TVH0560AD
		4TVH0270AD	4TVH0425AD	4TVH0580AD
		4TVH0290AD	4TVH0445AD	4TVH0600AD
		4TVH0310AD	4TVH0465AD	4TVH0620AD

⚠SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

February 2012

VRF-SVM33A-EN

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Warnings, Cautions, and Notices

Warnings, cautions, and notices are provided in appropriate places throughout this document:

> ⚠ **WARNING:** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
>
> ⚠ **CAUTION:** Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
>
> ***NOTICE:*** Indicates a situation that could result in equipment or property-damage-only accidents.

⚠WARNING

Personal Protective Equipment (PPE) Required!

Installing/servicing this unit could result in exposure to electrical, mechanical, and chemical hazards. Failure to follow recommendations could result in death or serious injury.

- **Before installing/servicing this unit, technicians MUST put on all Personal Protective Equipment (PPE) recommended for the work being undertaken. ALWAYS refer to appropriate MSDS sheets and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate MSDS sheets and OSHA guidelines for information on allowable personal exposure levels, proper respiratory protection and handling recommendations.**
- **If there is a risk of arc or flash, technicians MUST put on all necessary Personal Protective Equipment (PPE) in accordance with NFPA70E for arc/flash protection PRIOR to servicing the unit.**

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Part 1 General Information

Introduction: TVR™ II DC Inverter VRF System

Free Combination with the World's Largest Capacity, 64HP

- By virtue of combination with maximum 4 outdoor units in 5 different capacities (8, 10, 12, 14 and 16HP) and maximum 64 indoor units, TVR™ II system achieves maximum capacity of 64HP (4TVH0620).

High efficiency and Energy-saving:

- TVR™ II System achieves the highest energy efflciency levels in the industry by utilizing the brushless reluctance DC compressor control, DC fan motor and improved performance heat exchanger.

High Efficiency Full DC Inverter Compressor Technology, saving power consumption by 25%

Figure 1

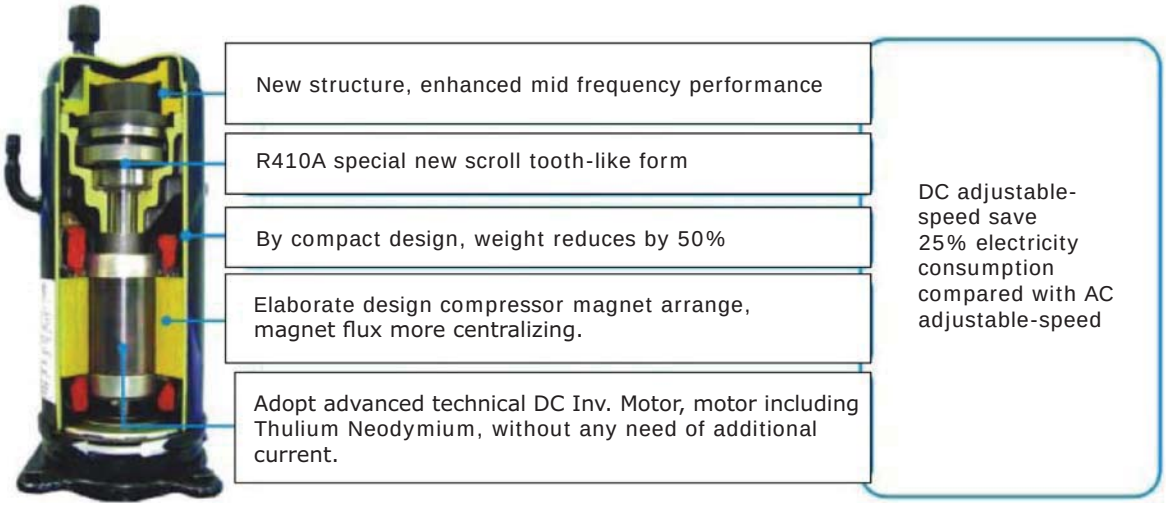
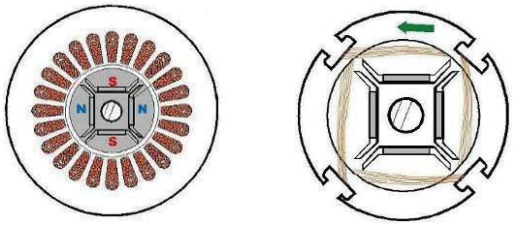

New structure, enhanced mid frequency performance
R410A special new scroll tooth-like form
By compact design, weight reduces by 50%
Elaborate design compressor magnet arrange, magnet flux more centralizing.
Adopt advanced technical DC Inv. Motor, motor including Thulium Neodymium, without any need of additional current.
DC adjustable-speed save 25% electricity consumption compared with AC adjustable-speed

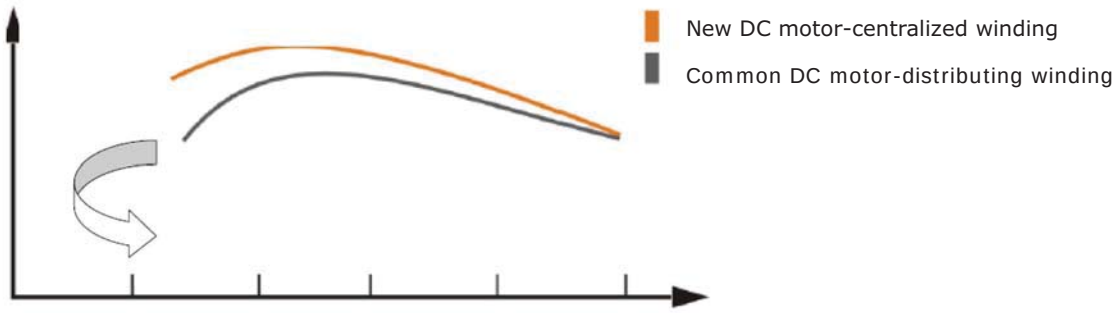
Figure 2

- Powerful magnets provide high torque and efficiency and achieve 70% reduction in volume.



Centralizing winding Distributing winding

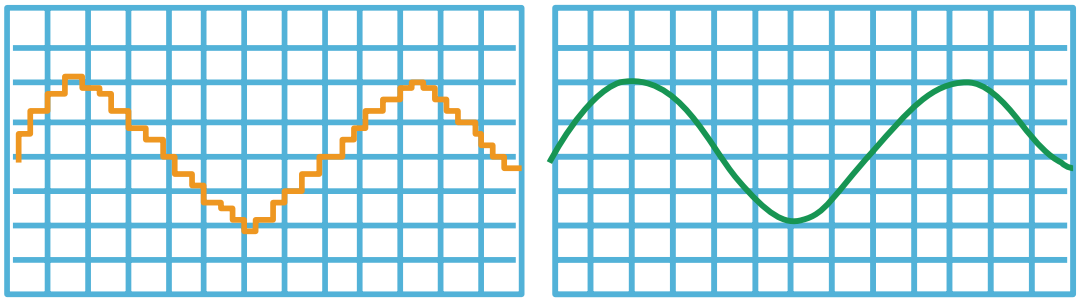
Figure 3



Smooth sine wave DC Inverter

- Motor uses 180°sine wave vector drive technology to ensure transducer to output smooth curve, resulting enhanced efficiency as the common saw-tooth motor wave would not indicate the motor speed precisely.

Figure 4



Common sawtooth wave

Sine Wave DC inverter

High efficiency DC Fan motor, saving power by 50%

According to the running load and pressure, it controls the speed of DC fan motor to achieve the min. energy consume, thus producing the best effect.

- Applicable to the entire range of models (from 8 to 64 HP).
- Efficiency improvement up to 45% especially at low speed

Figure 5

Pressure sensor

DC Fan Motor

Figure 6

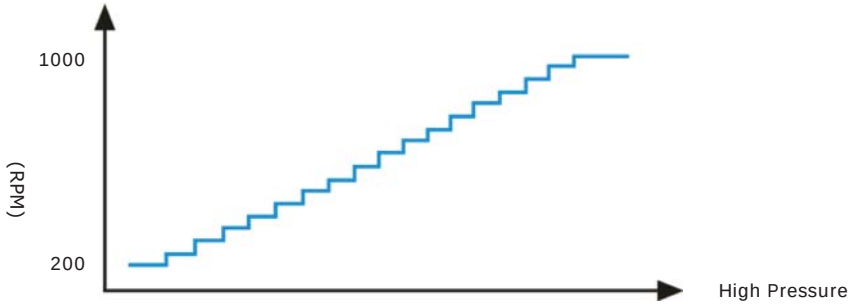
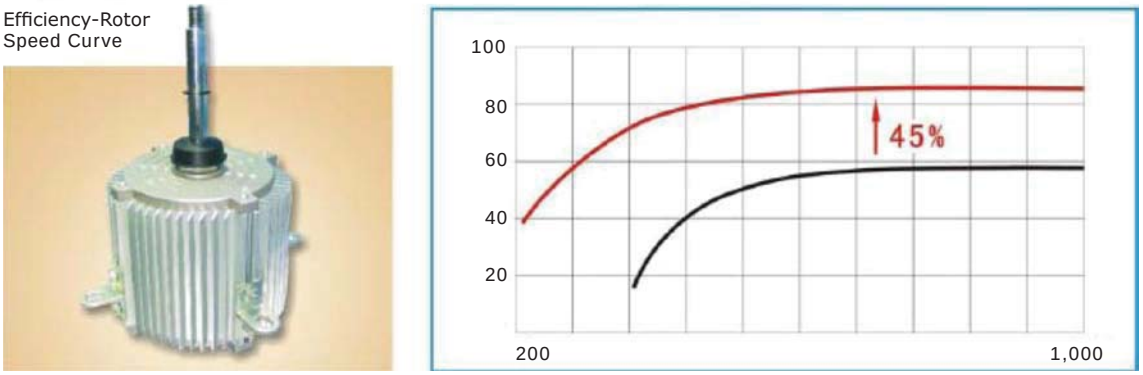


Figure 7



- Motor rotor speed waves are of ±5r, thus could rapidly match DC Inverter Compressor to output, resulting enhanced efficiency in part load.

Optimized heat exchange design, with the exchange efficiency increased by 10%

- Optimized heat-exchanger structure and material by CFD simulation and in part load TVR™ II outdoor unit owns 100% exchanger using ratio. With adoption of Pressure Sensor and DC fan motor, TVR™ II achieves remarkable improvement in terms of efficiency compared to previous products.

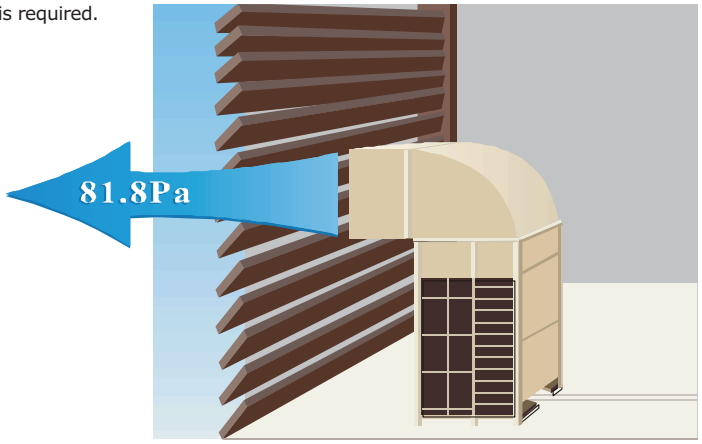
More flexible design

External static pressure up to 81.8Pa and air volume increased by 10%

- Applied high static pressure propeller fan and the optimum fan guard for high external static pressure, to respond to a range of various installation environments.
- Trane now offers up to 81.8Pa (10 mm H_2O) external static pressure specification as an option, which only needs on-site adjustment to meet the requirements of veranda installation.

Figure 8

Customization is required.



More options of Indoor units and high capacity connection

- Heat pump is of 8 to 64 HP and indoor units consist of 10 types with 64 models in total (not including Fresh Air Processing Units), making it possible to build a system that suits all the customer's requirement. The capacity ranges from 6-95MBH and the outdoor unit capacities allow up to 130% indoor unit's connective ratio.

Superior Comfort

Optional outdoor units Silent Mode control

- Night silent operation will be activated X (6, 8) hours after the peak temperature during daytime, and it will get back to normal operation after Y (8,10,12) hours. The sound level can be down to 46.8dB(A) in low speed.

Figure 9

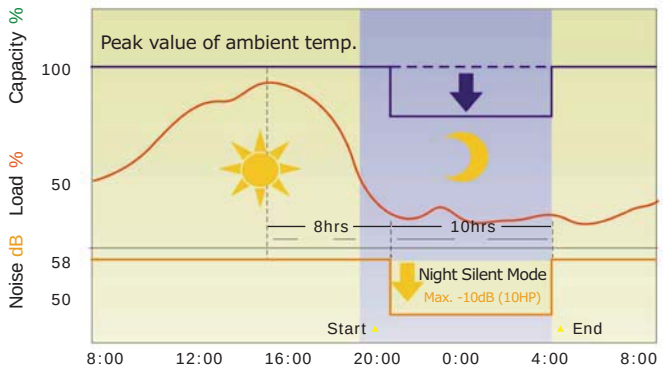
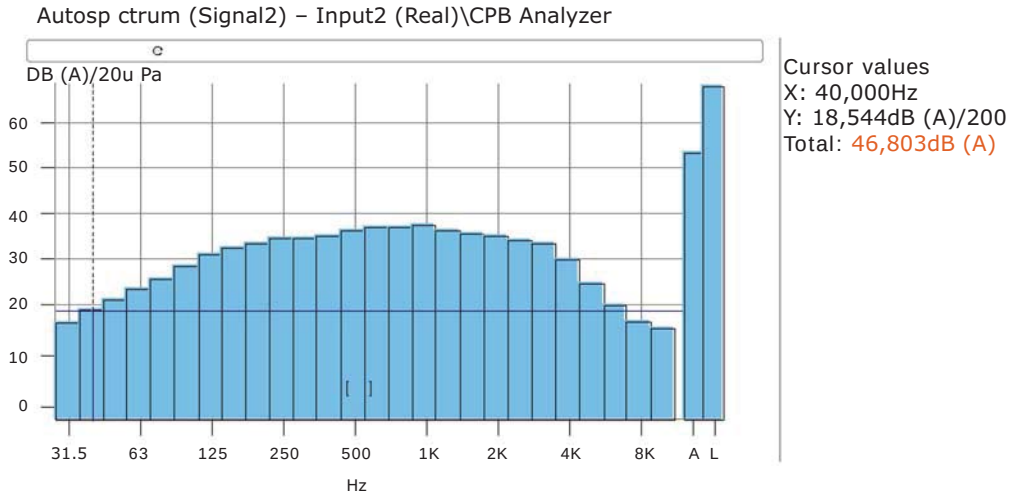


Figure 10



More options for outdoor units

- With all these modes available: High static pressure mode, 0 static pressure mode (default), silent mode in night mode, silent mode, super silent mode and capacity priority mode.

Optimized fan pass design and enhanced outlet static pressure technology

- Take 4TVH0155 for instance, the unit possesses increased static pressure but reduced loss of pressure, input and also the noise level.

Figure 11

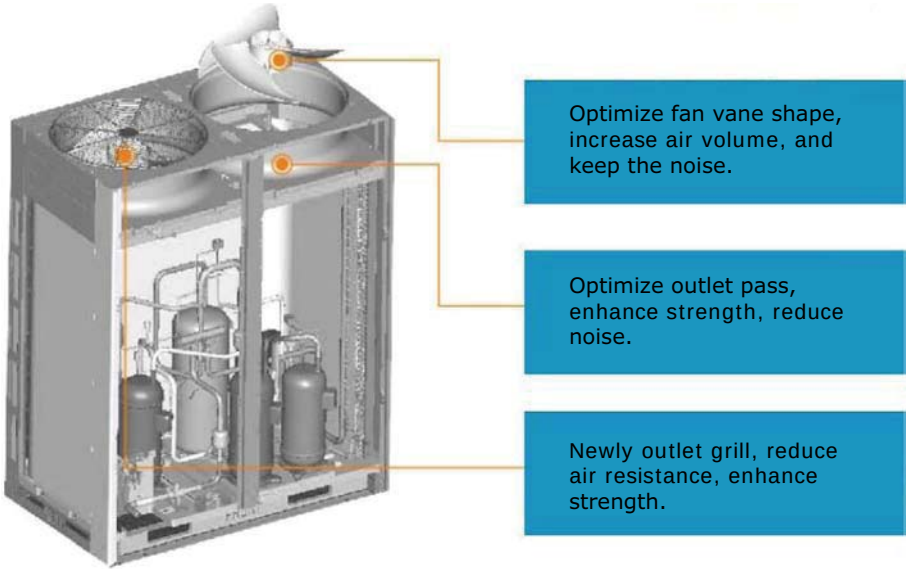
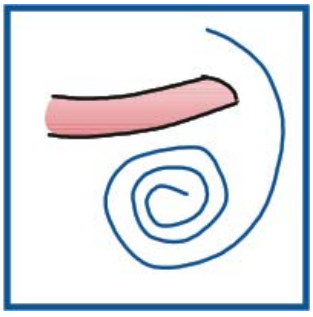

Optimize fan vane shape, increase air volume, and keep the noise.
Optimize outlet pass, enhance strength, reduce noise.
Newly outlet grill, reduce air resistance, enhance strength.

Figure 12

New designed fan outlet grill

Figure 13

New designed fan impeller



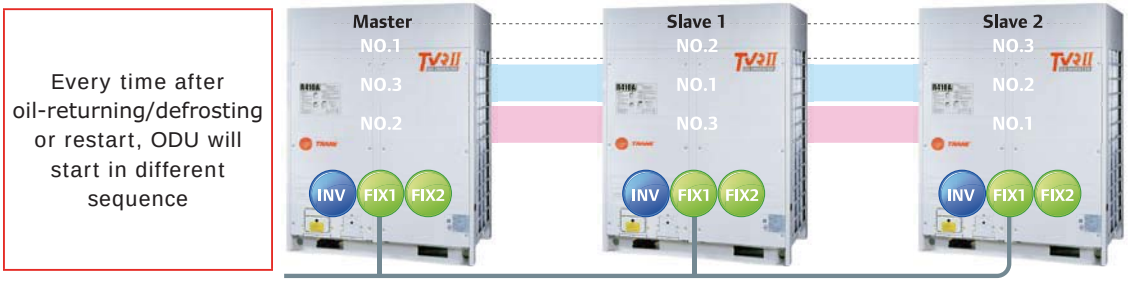
Conventional fan impeller

High Reliability

Alternative Cycle Duty operation of outdoor units

- According to the system load, TVR™ II intelligent control cyclically changes start up sequence of multiple outdoor units, equalizes compressor duty and extends operation life-span.

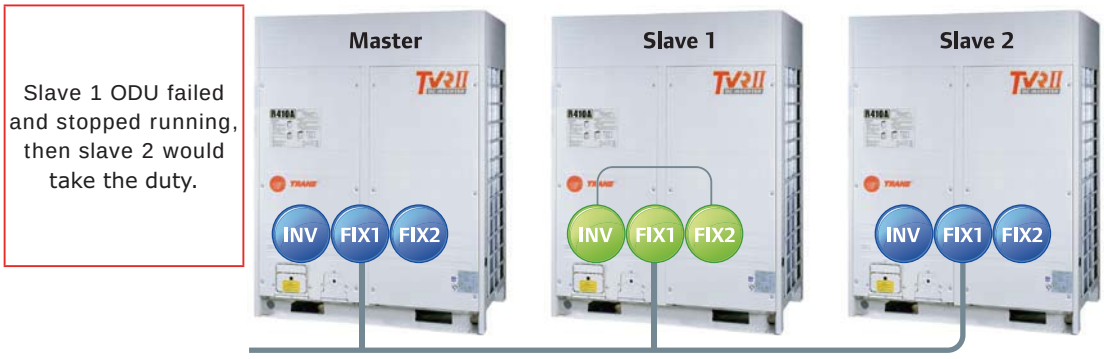
Figure 14



Back-up operation function

- In the case of outdoor unit fail, the field set back-up function of the corresponding outdoor unit (also between different outdoor units) will allow emergency operation of another outdoor unit, thus maintain the interim capacity.

Figure 15



Dynamic gas balance technology

Dynamic vector balance technology, free from any need to install gas balance pipe

- High-precision pressure sensor monitors the system pressure on time and transfers the data to master unit
- Master unit sends the pressure data to every unit and ensures balance among each outdoor unit

High efficiency oil balance technology

- With oil balance pipe set among the modules, smooth compressor and reliable operation resulted from even oil distribution among the modules could be achieved. When one compressor's oil is overfull, both oil balance pipes and outlet pipes will send the oil to system, and then the system will distribute the oil to other compressors.

Oil balance diagram

Figure 16

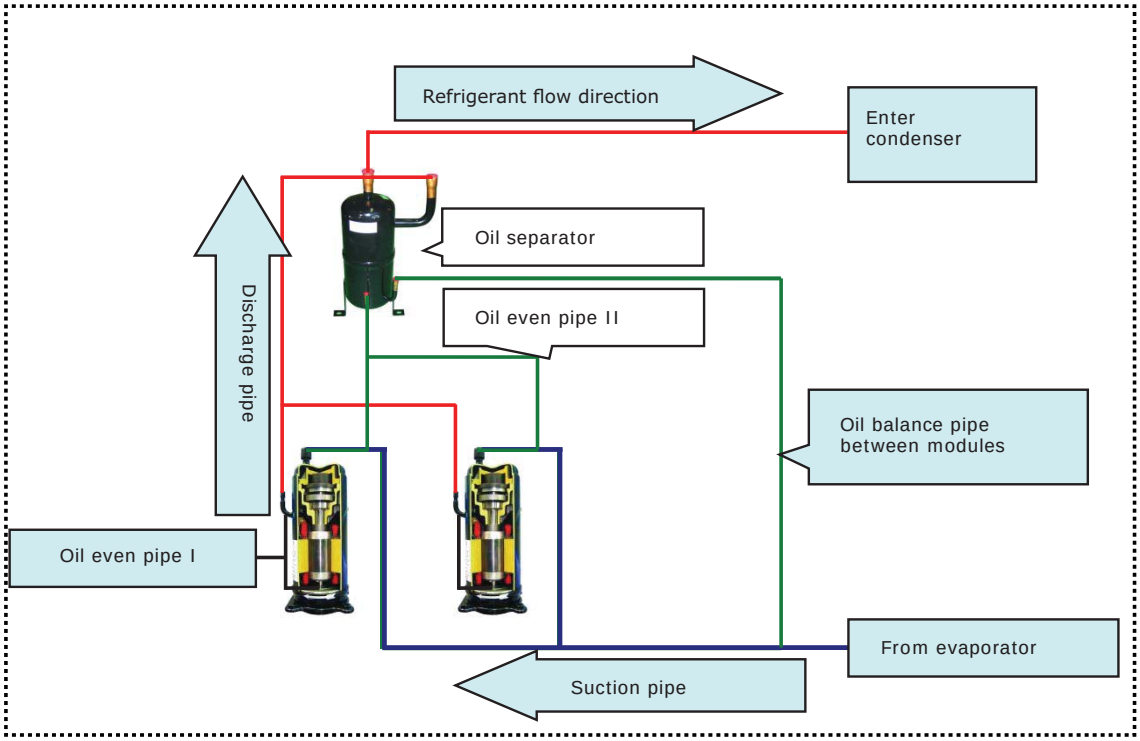
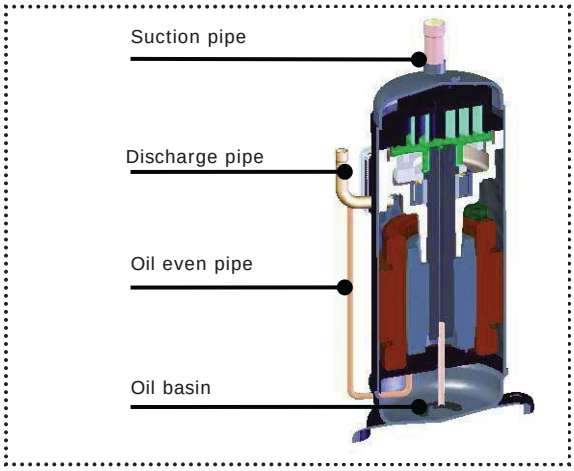


Figure 17



High efficiency centrifugal oil separator (up to 99%) makes oil separate from dischargeand go back to compressor.

- New designed low pressure liquid receiver with high efficiency of oil-return effect.
- Oil balance ensures sufficient refrigerant lubricant supply. Elaborately designed oil-return hole ensures reliable oil return for every compressor.

Oil return technology

- Centrifugal oil separator can be up to over 99% separating efficiency, which could send the oil to compressors timely, ensuring compressor oil volume.
- System auto back oil design can complete through PC core send oil back instruction by system running time and state.
- The large volume design of the accumulator can save more refrigerant to avoid liquid strike.
- Multi back oil holes can ensure compressor smooth back oil.

Intelligent soft start technology, rapidly enhance refrigerant cycle volume

Compressor soft start complete low frequency and low current start by DC Inverter compressor; and also reduce strike to electric network. Once start DC Inverter Compressor, the system will run in large volume and offer more heating capacity.

- Compressor soft start
- Lubrication system soft start

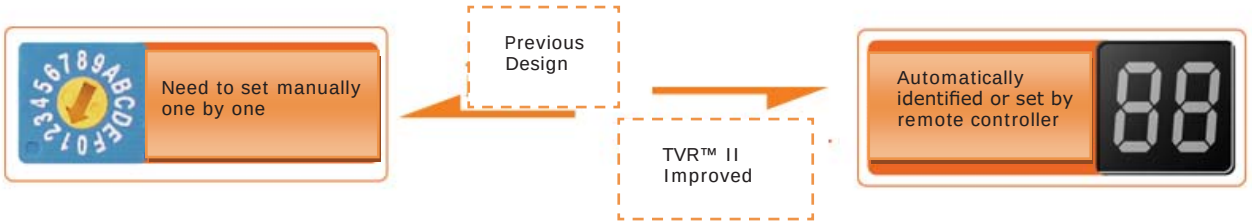
Convenient for installation and service

Auto addressing

Upon press the button of the controller, the address of the outdoor units and indoor units will be set automatically.

- The outdoor unit can automatically distribute the address to indoor units without any manual settings.
- Wired controller and wireless controller can enquiry and modify every indoor units address.
- Up to 64 indoor units can be connected to a single system and identified automatically.

Figure 18


Need to set manually one by one
Previous Design
TVR™ II Improved
Automatically identified or set by remote controller
88

Super Wiring

It is possible to enable the sharing of the wire between the indoor & outdoor units, as well as the centralized control, hence making it easy for the users to retrofit the existing system with a centralized control.

- PQE & XYE, just only one group of communication wire of PQE, achieve communication for both indoor & outdoor unit and network.
- Reversible communication could be accessed from both indoor side or outdoor side.

Figure 19

Convenient for maintenance

Figure 20

Convenient electronic control monitoring panel.
Upon press of FORCE COOLING/ CHECK button, the operation status could be observed easily from the LED display.

Figure 21

Refrigerant check and charge valve, for future recharge refrigerant

Figure 22

Compressor is near the outside unit and there is simple pipe system for convenient maintenance.

Model Line Up

Outdoor units (Combination Unit):

Table 1

4TVH0086-0096 (8-10HP)	4TVH0115-0155 (12-16HP)
4TVH0182-0310 (18-32HP)	4TVH0327-0465 (34-48HP)
4TVH0492-0620 (50-64HP)	

Units Combination Table

Table 2

Capacity (HP)	Model	Recommend combination					Max. indoor units nos.
		4TVH0086	4TVH0096	4TVH0115	4TVH0135	4TVH0155	
8	4TVH0086AD000AA	●					13
10	4TVH0096AD000AA		●				16
12	4TVH0115AD000AA			●			16
14	4TVH0135AD000AA				●		16
16	4TVH0155AD000AA					●	20
18	4TVH0182AD000AA	●	●				20
20	4TVH0192AD000AA		●●				24
22	4TVH0211AD000AA		●	●			24
24	4TVH0231AD000AA		●		●		28
26	4TVH0251AD000AA		●			●	28
28	4TVH0270AD000AA				●●		28
30	4TVH0290AD000AA				●	●	32
32	4TVH0310AD000AA					●●	32
34	4TVH0327AD000AA		●●		●		36
36	4TVH0347AD000AA		●●			●	36
38	4TVH0366AD000AA		●	●		●	36
40	4TVH0386AD000AA		●		●	●	42
42	4TVH0405AD000AA				●●●		42
44	4TVH0425AD000AA				●●	●	42
46	4TVH0445AD000AA				●	●●	48
48	4TVH0465AD000AA					●●●	48
50	4TVH0492AD000AA	●	●			●●	54
52	4TVH0502AD000AA		●●			●●	54
54	4TVH0521AD000AA		●	●		●●	54
56	4TVH0541AD000AA		●		●	●●	58
58	4TVH0560AD000AA				●●●	●	58
60	4TVH0580AD000AA				●●	●●	58
62	4TVH0600AD000AA				●	●●●	64
64	4TVH0620AD000AA					●●●●	64

Capacity Range of Indoor Units

Power supply of all the indoor units is 1 phase, 220-240V or 3 phase, 380-415V, 50Hz

Table 3

Capacity (kW)	1.8	2.2	2.8	3.6	4.5	5.6	7.1	8.0	9.0	10.0	11.2	12.5	14.0	16.0	20.0	25.0	28.0
MBH	6	7.5	9	12	15	18	24	27	30	34	38	42	48	54	68	85	95
TR	0.5	0.6	0.8	1.0	1.3	1.6	2.0	2.3	2.6	2.9	3.2	3.5	4.0	5.0	5.7	7.1	8.0
HP	0.6	0.8	1.0	1.3	1.6	2.0	2.5	2.8	3.2	3.6	4.0	4.4	5.0	6.0	8.0	9.0	10.0
INDEX	18	22	28	36	45	56	71	80	90	100	112	125	140	160	200	250	280
One Way Cassette			√	√	√	√	√										
Modern Four-Way Cassette		√	√	√	√												
Four-Way Cassette		√	√	√	√	√	√	√	√	√	√		√				
Low Static Pressure Concealed Type	√	√	√	√	√	√											
Medium Static Pressure Concealed Type		√	√	√	√	√	√	√	√		√		√				
High Static Pressure Concealed Type							√	√	√		√		√	√	√	√	√
Convertible Type				√	√	√	√	√	√		√		√				
High-Wall Q & R Series		√	√	√	√	√											
Fresh Air Processing Unit												√	√		√	√	√

Appearance and Model Number of Indoor Units

Table 4

Appearance	Model Number	Appearance	Model Number
One-way cassette	4MVA0009AB000AA 4MVA0012AB000AA 4MVA0015AB000AA 4MVA0018AB000AA 4MVA0024AB000AA	**Modern Four-Way Cassette**	4MVB0007AB000AA 4MVB0009AB000AA 4MVB0012AB000AA 4MVB0015AB000AA
Four-Way Cassette	4MVC0018AB000AA 4MVC0024AB000AA 4MVC0027AB000AA 4MVC0030AB000AA 4MVC0034AB000AA 4MVC0038AB000AA 4MVC0048AB000AA	**Low Static Pressure Concealed Type**	4MVL0006AB000AA 4MVL0007AB000AA 4MVL0009AB000AA 4MVL0012AB000AA 4MVL0015AB000AA 4MVL0018AB000AA
Medium Static Pressure Concealed Type	4MVD0007AB000AA 4MVD0009AB000AA 4MVD0012AB000AA 4MVD0015AB000AA 4MVD0018AB000AA 4MVD0024AB000AA 4MVD0027AB000AA 4MVD0030AB000AA 4MVD0038AB000AA 4MVD0048AB000AA	**High Static Pressure Concealed Type**	4MVH0024AB000AA 4MVH0027AB000AA 4MVH0030AB000AA 4MVH0038AB000AA 4MVH0048AB000AA 4MVH0054AB000AA 4MVH0068AB000AA 4MVH0085AB000AA 4MVH0095AB000AA
Fresh Air Processing Unit	4MVF0042AB000AA 4MVF0048AB000AA 4MVF0068AB000AA 4MVF0085AB000AA 4MVF0095AB000AA	**Convertible Type**	4MVX0012AB000AA 4MVX0015AB000AA 4MVX0018AB000AA 4MVX0024AB000AA 4MVX0027AB000AA 4MVX0030AB000AA 4MVX0038AB000AA 4MVX0048AB000AA
High-Wall Q Series	4MVW0012AB000AA 4MVW0015AB000AA 4MVW0018AB000AA 4MVW0007ABA00AA 4MVW0009ABA00AA 4MVW0012ABA00AA 4MVW0015ABA00AA 4MVW0018ABA00AA	**High-Wall R Series**	4MVW0007BB0E0AA 4MVW0009BB0E0AA 4MVW0012BB0E0AA 4MVW0015BB0E0AA 4MVW0018BB0E0AA 4MVW0007BBAE0AA 4MVW0009BBAE0AA 4MVW0012BBAE0AA 4MVW0015BBAE0AA 4MVW0018BBAE0AA

Nomenclature

Outdoor Unit

4	T	V	H	0	0	8	6	A	D	0	0	0	A	A
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Digit #1 = Refrigerant

2 = R22

4 = R-410a

Digit #2 = Brand Name

T = Trane

R = Ingersoll Rand

Digit #3 = System Type

V = Variable Refrigerant Flow

W = Variable Water Flow

Digit #4 = Functional Type

F = Cooling Only, Digital Scroll (VRF)

C = Cooling Only, DC Inverter (VRF)

B = Heat Pump, Digital Scroll (VRF)

H = Heat Pump, DC Inverter (VRF)

X = Heat Recovery (3-pipe), DC Inverter (VRF)

D = Heat Recovery (3-pipe), Digital Scroll (VRF)

Digit #5 =Reserved for Future Use

0 = Not currently used

Digit #6, 7, 8 = Nominal Capacity (Btu/h x 1,000)

086 = 86,000 Btu/h

096 = 96,000 Btu/h

115 = 115,000 Btu/h

135 = 135,000 Btu/h

155 = 155,000 Btu/h

Digit #9 = Major Development Sequence

A = First Development Sequence

Digit #10 = Electric Power Supply Characteristics

B = 220-240V/1ph/50Hz

D = 380-415V/3ph/50Hz

Digit #11, 12, 13= Reserved for Future Use

0 = Not currently used

Digit #14 = Minor Design Sequence

A = First Design Sequence

Digit #15 = Device Digit

A = First Sequence

Indoor Unit Nomenclature

4	M	V	H	0	0	6	8	A	B	0	0	0	A	A
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Digit #1 = Refrigerant
- 2 = R-22
- 4 = R-410a

Digit #2 = Brand Name
- M = Trane Minisplit
- R = Ingersoll Rand

Digit #3 = System Type
- V = Variable Refrigerant Flow
- W = Variable Water Flow

Digit #4 = Configuration Type
- A = One Way Cassette
- B = Modern 4-Way Cassette
- C = 4-Way Cassette
- D = Medium Pressure Static Concealed Type
- L = Low Pressure Static Concealed Type
- H = High Pressure Static Concealed Type
- X = Convertible Type
- W = High Wall Type
- F = Fresh Air Processing Unit

Digit #5 = Reserved for Future Use
- 0 = Not currently used

Digit #6, 7, 8 = Nominal Capacity (Btu/h x 1,000)
- 006 = 6,000 Btu/h
- 007 = 7,500 Btu/h
- 009 = 9,000 Btu/h
- 012 = 12,000 Btu/h
- 015 = 15,000 Btu/h
- 018 = 18,000 Btu/h
- 024 = 24,000 Btu/h
- 027 = 27,000 Btu/h
- 030 = 30,000 Btu/h
- 034 = 34,000 Btu/h
- 036 = 36,000 Btu/h
- 038 = 38,000 Btu/h
- 048 = 48,000 Btu/h
- 054 = 54,000 Btu/h
- 068 = 68,000 Btu/h
- 085 = 85,000 Btu/h
- 095 = 95,000 Btu/h

Digit #9 = Major Development Sequence
- A = First Development Sequence

Digit #10 = Electric Power Supply Characteristics
- 1 = 208-230V/1ph/60Hz
- B = 220-240V/1ph/50Hz

Digit #11 = Electric Heat Capacity
- 0 = None

Digit #12 = Special Features
- 0 = None
- E = Integrated EXV

Digit #13 = Reserved for Future Use
- 0 = Not currently used

Digit #14 = Minor Design Sequence
- A = First Design Sequence

Digit #15 = Service Digit
- A = First Sequence

Model Number Description

Controls Nomenclature

T	M	U	C	W	0	0	1	A
1	2	3	4	5	6	7	8	9

Digit #1 = Brand Name
- T = Trane
- R = Ingersoll Rand

Digit #2 = Configuration
- O = Outdoor
- M = Indoor
- S = System

Digit #3 = Features
- U = Unit Control
- C = Centralized Control
- N = Networking Control

Digit #4 = Function
- C = Control
- H = TERV Control
- S = Software
- E = Energy Measurement

Digit #5 = Type
- W = Wired Controller
- R = Wireless Remote Controller
- A = Accessories

Digit #6, 7, 8 = Running number
- 001= Sequence

Digit #9 = Future Use
- A = Standard

Part 2 Selection Procedure

Introduction

Model Selection Procedure

Select the model and calculate the capacity for each refrigerant system according to the procedure shown below.

Calculation of the indoor air-conditioning load.

- Calculate the maximum air-conditioning load for each room or zone.

Selection of an air conditioning system

- Select the ideal air conditioning system for air conditioning of each room or zone

Design of the control system

- Design a suitable control system for the selected air conditioning system

Preliminary selection of indoor and outdoor units

- Make preliminary selections that are within the allowable range for the system

Check of the piping length and elevation difference

- Check that the length of refrigerant piping and the elevation difference are within the allowable ranges

Calculation of the corrected outdoor unit capacity

- Capacity correction coefficient for model, outdoor temperature conditions, piping length and elevation difference

Calculation of the actual capacity for each indoor unit

- Calculate the corrected indoor/outdoor capacity ratio, based on the corrected outdoor unit capacity and the total corrected capacity of all indoor units in the same system

Recheck of the actual capacity for each indoor unit

- If the capacity is inadequate, reexamine the unit combinations.

Indoor Unit Selection

Enter INDOOR UNIT CAPACITY TABLES at given indoor and outdoor temperature. Select the unit that the capacity is the nearest to and greater than given load.

Notes:

Individual indoor unit capacity is subject to change by the combination. Actual capacity has to be calculated according to the combination in outdoor unit capacity table.

Calculation of Actual Capacity of Indoor Unit

Because the capacity of a multi air-conditioner changes according to the temperature conditions, piping length, elevation difference and other factors, select the correct model after taking into account the various correction values. When selecting the model, calculate the corrected capacities of the outdoor unit and each indoor unit. Use the corrected outdoor unit capacity and the total corrected capacity of all the indoor units to calculate the actual final capacity of each indoor unit.

Find the indoor unit capacity correction coefficient for the following items

- Capacity correction for the indoor unit temperature conditions
  From the graph of capacity characteristics, use the indoor temperature to find the capacity correction coefficient.
- Capacity distribution ratio based on the indoor unit piping length and elevation difference. Use the piping length and elevation difference for each indoor unit to find the correction coefficient according to the graph of capacity change characteristics as for the outdoor unit.

Capacity distribution ratio for each indoor unit = Correction coefficient for that indoor unit / Correction coefficient for the outdoor unit

Outdoor Unit Selection

Allowable combinations are indicated in INDOOR UNIT COMBINATION TOTAL CAPACITY INDEX TABLE. In general, outdoor unit can be selected as follows though the location of the unit, zoning and usage of the rooms may be considered.

The indoor and outdoor unit combination is determined that the sum of indoor unit capacity index is nearest to and smaller than the capacity index at 100% combination ratio of each outdoor unit. Up to 8~16 indoor units can be connected to one outdoor unit. It is recommended to choose a larger outdoor unit if the installation space is large enough.

If the combination ratio is greater than 100%, the indoor unit selection shall be reviewed by using actual capacity of each indoor unit.

INDOOR UNIT COMBINATION TOTAL CAPACITY INDEX TABLE

Table 1

Outdoor Unit	Indoor Unit Combination Ratio (kW)								
	130%	120%	110%	100%	90%	80%	70%	60%	50%
4TVH0086AD000AA	32.8	30.2	27.7	25.2	22.7	20.2	17.6	15.1	12.6
4TVH0096AD000AA	36.4	33.6	30.8	28.0	25.2	22.4	19.6	16.8	14.0
4TVH0115AD000AA	43.6	40.2	36.9	33.5	30.2	26.8	23.5	20.1	16.8
4TVH0135AD000AA	52.0	48.0	44.0	40.0	36.0	32.0	28.0	24.0	20.0
4TVH0155AD000AA	58.5	54.0	49.5	45.0	40.5	36.0	31.5	27.0	22.5
4TVH0182AD000AA	69.2	63.8	58.5	53.2	47.9	42.6	37.2	31.9	26.6
4TVH0192AD000AA	72.8	67.2	61.6	56.0	50.4	44.8	39.2	33.6	28.0
4TVH0211AD000AA	80.0	73.8	67.7	61.5	55.4	49.2	43.0	36.9	30.7
4TVH0231AD000AA	88.4	81.6	74.8	68.0	61.2	54.4	47.6	40.8	34.0
4TVH0251AD000AA	94.9	87.6	80.3	73.0	65.7	58.4	51.1	43.8	36.5
4TVH0270AD000AA	102.1	94.2	86.4	78.5	70.7	62.8	54.9	47.1	39.2
4TVH0290AD000AA	110.5	102.0	93.5	85.0	76.5	68.0	59.5	51.0	42.5
4TVH0310AD000AA	117.0	108.0	99.0	90.0	81.0	72.0	63.0	54.0	45.0
4TVH0327AD000AA	124.8	115.2	105.6	96.0	86.4	76.8	67.2	57.6	48.0
4TVH0347AD000AA	131.3	121.2	111.1	101.0	90.9	80.8	70.7	60.6	50.5
4TVH0366AD000AA	138.5	127.8	117.2	106.5	95.9	85.2	74.5	63.9	53.2
4TVH0386AD000AA	146.9	135.6	124.3	113.0	101.7	90.4	79.1	67.8	56.5
4TVH0405AD000AA	153.4	141.6	129.8	118.0	106.2	94.4	82.6	70.8	59.0
4TVH0425AD000AA	160.6	148.2	135.9	123.5	111.2	98.8	86.4	74.1	61.7
4TVH0445AD000AA	169.0	156.0	143.0	130.0	117.0	104.0	91.0	78.0	65.0
4TVH0465AD000AA	175.5	162.0	148.5	135.0	121.5	108.0	94.5	81.0	67.5
4TVH0492AD000AA	186.2	171.8	157.5	143.2	128.9	114.6	100.2	85.9	71.6
4TVH0502AD000AA	189.8	175.2	160.6	146.0	131.4	116.8	102.2	87.6	73.0
4TVH0521AD000AA	197.0	181.8	166.7	151.5	136.4	121.2	106.1	90.9	75.7
4TVH0541AD000AA	205.4	189.6	173.8	158.0	142.2	126.4	110.6	94.8	79.0
4TVH0560AD000AA	211.9	195.6	179.3	163.0	146.7	130.4	114.1	97.8	81.5
4TVH0580AD000AA	219.1	202.2	185.4	168.5	151.7	134.8	118.0	101.1	84.2
4TVH0600AD000AA	227.5	210.0	192.5	175.0	157.5	140.0	122.5	105.0	87.5
4TVH0620AD000AA	234.0	216.0	198.0	180.0	162.0	144.0	126.0	108.0	90.0

INDOOR UNIT CAPACITY INDEX

Table 2

Unit Capacity (MBH)	6	7.5	9	12	15	18	24	27	30
Capacity Index (kW)	1.8	2.2	2.8	3.6	4.5	5.6	7.1	8.0	9.0
Unit Capacity (MBH)	34	38	42	48	54	68	85	95	
Capacity Index (kW)	10.0	11.2	12.5	14.0	16.0	20.0	25.0	28.0	

Actual Performance Data

Use OUTDOOR UNIT CAPACITY TABLES.
Determine correct table according to the outdoor unit model and combination ratio.
Enter the table at given indoor and outdoor temperature and find the outdoor unit capacity and power input. The individual indoor unit capacity (power input) can be calculated as follows.

IUC=OUC × INX/TNX
IUC: Each indoor unit capacity
OUC: Outdoors unit capacity
INX: Each indoor unit capacity index
TNX: Total capacity index

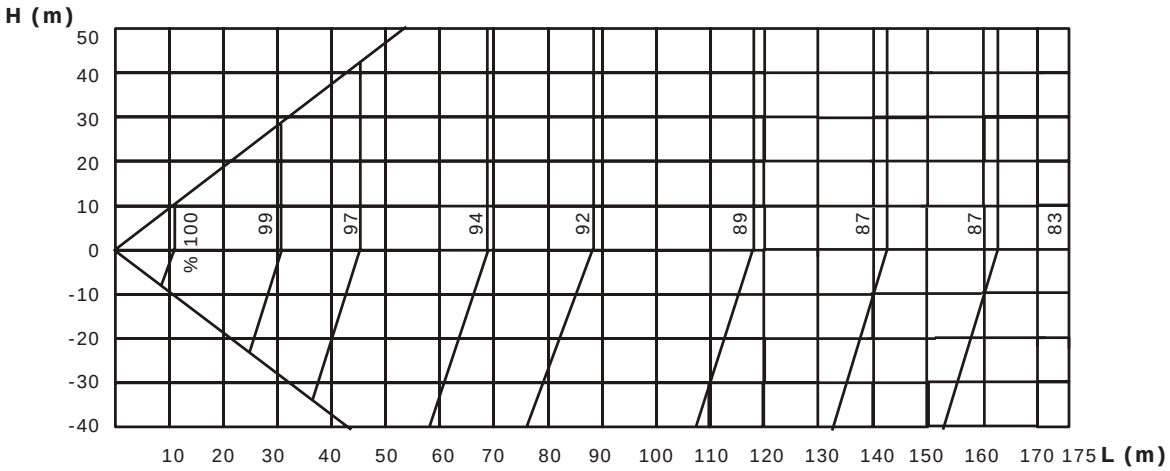
Then, correct the indoor unit capacity according to the piping length.
If the corrected capacity is smaller than the load, the size of indoor unit has to be increased and then repeat the same selection procedure.

Variation in capacity in accordance with the length of refrigerant pipe

Cooling capacity modification

Modification coefficient of the length and high difference of refrigerant pipe:

Figure 1



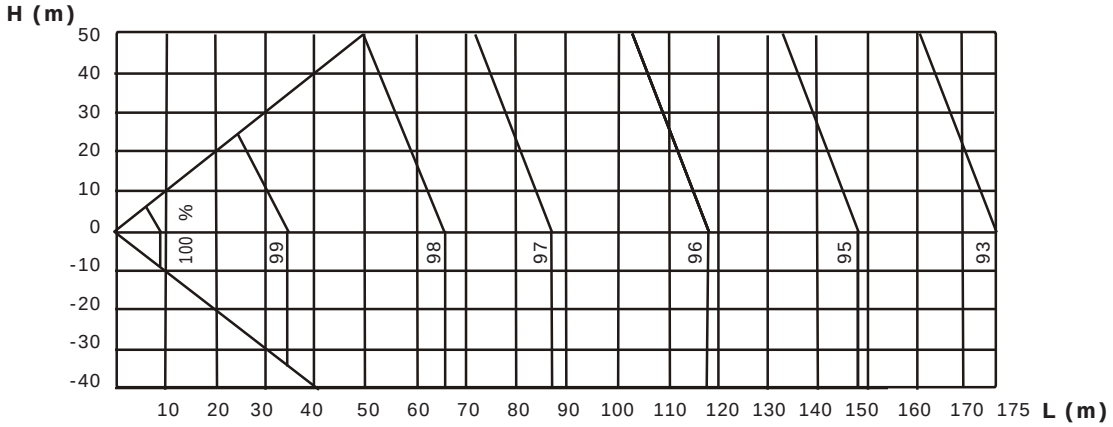
L: Refrigerant pipe equivalent length

H: Height difference between outdoor and indoor

Heating capacity modification

Modification coefficient of the length and high difference of refrigerant pipe:

Figure 2



L: Refrigerant pipe equivalent length

H: Height difference between outdoor and indoor

Unit Selection (Based on cooling load)

Given condition

- Design condition (Cooling: Indoor 20°C (WB), Outdoor 35°C (DB))
- Cooling load

Table 3

Location	Room A	Room B	Room C	Room D	Room E	Room F
Load (kW)	2.1	2.8	3.5	4.6	5.8	7.2

- Power supply unit: Outdoor 380~415V-3Ph-50Hz, Indoor 220~240V-1Ph-50Hz.
- Pipe length: 50m
- Height difference: 30m

Indoor unit selection

Select the suitable capacity for condition of 'Indoor 20°C (WB), Outdoor 35°C (DB)' using indoor unit capacity table. The selected result is as follows. (Assuming the indoor unit type is duct)

Table 4

Location	Room A	Room B	Room C	Room D	Room E	Room F
Load (kW)	2.1	2.8	3.5	4.6	5.8	7.2
Unit capacity (MBH)	7.5	9	12	15	18	24
Capacity (kW)	2.3	2.9	3.7	4.8	6.0	7.5

Outdoor unit selection

- Assume the indoor unit and outdoor unit combination as follows
  Calculate the total nominal capacity of indoor units in the combination according to the above table:
  2.2 × 1 +2.8 × 1+ 3.6 × 1 +4.5 × 1+ 5.6 × 1 + 7.1 × 1 = 25.8kW
- Select outdoor unit: 4TVH0096 which has nominal cooling capacity: 28kW.
  Calculate the proportion between ① and ②: 258/280= 92%
- Result : Because the proportion is within 50~130%, it is a "Right" selection.
- Real function data with indoor unit combination

  For the 92% combination, calculate the cooling capacity of outdoor unit (4TVH0096).

  26.65KW ←90% (Indoor temperature: WB 20°C, Outdoor temperature: DB 35°C)
  29.61KW ←100%(Indoor temperature: WB 20°C, Outdoor temperature: DB 35°C)
  Then calculated the outdoor capacity in 92% combination index:
  Therefore: 26.65+ {(29.61-26.65)/ 10} ×2= 27.24;

Outdoor unit (4TVH0096) cooling temperature: DB 35°C

Capacity modification coefficient with pipe length (50m) and height difference (30m): 0.958

Each indoor unit cooling capacity

4MVD0075: 27.24 × 22/258 ×0.958 = 2.22 (kW)
4MVD0009: 27.24 × 28/258 ×0.958 = 2.83 (kW)
4MVD0012: 27.24 × 36/258 ×0.958 = 3.64 (kW)
4MVD0015: 27.24 × 45/258 ×0.958 = 4.55 (kW)
4MVD0018: 27.24 × 56/258 ×0.958 = 5.66 (kW)
4MVD0024: 27.24 × 71/258 ×0.958 = 7.18 (kW)

Table 5

Location	Room A	Room B	Room C	Room D	Room E	Room F
Load (kW)	2.1	2.8	3.5	4.6	5.8	7.2
Unit capacity (MBH)	7.5	9	12	15	18	24
Capacity (kW)	2.22	2.83	3.64	4.55	5.66	7.18

Conclusion

Generally, we think this result is acceptable and assume that we have accomplished the calculation. The above process has to be repeated when the result is not acceptable.
Remark: In this sample, we don't consider the other capacity modification index and assume them are 1.0.

For more details about the effect factor such as outside ambient/inside ambient DB/WB, please refer to the performance table of indoor and outdoor units.

Part 3 Specification & Performance

Specifications

Table 1

Trane Model			4TVH0086AD000AA	4TVH0096AD000AA	4TVH0115AD000AA
Power Supply		V/ph/Hz	380-415/3/50	380-415/3/50	380-415/3/50
Cooling (*1)	Capacity	W	25.2	28.0	33.5
	Input	W	5,874	7,198	9,054
	EER	W/W	4.29	3.89	3.70
Heating (*2)	Capcity	kW	27.0	31.5	37.5
	Input	W	6,150	7,608	8,992
	COP	W/W	4.39	4.14	4.17
Max. Power Input		kW	14.5	14.5	14.5
Max. Current		A	24.5	24.5	24.5
DC Inverter Compressor	Model		E405DHD-36D2YG	E405DHD-36D2YG	E405DHD-36D2YG
	Quantity		1	1	1
	Type		DC Inverter	DC Inverter	DC Inverter
	Brand		Hitachi	Hitachi	Hitachi
	Capacity	kW	11.8	11.8	11.8
	Input	kW	5.1	5.1	5.1
	Power Supply	V/ph/Hz	380-415/3/50	380-415/3/50	380-415/3/50
	Operating Frequency	Hz	60 ~ 180	60 ~ 180	60 ~ 180
	Crankcase	W	40 ~ 80	40 ~ 80	40 ~ 80
	Refrigerant Oil	ml	FVC68D / 500	FVC68D / 500	FVC68D / 500
Fixed Speed Compressor	Model		E605DH-59D2YG	E655DH-65D2YG (GC)	E655DH-65D2YG (GC)
	Quantity		1	1	1
	Type		Scroll	Scroll	Scroll
	Brand		Hitachi	Hitachi	Hitachi
	Capacity	kW	15.4	17.1	17.1
	Input	kW	5.13	5.74	5.74
	Power Supply	V/ph/Hz	380-415/3/50	380-415/3/50	380-415/3/50
	LRA	A	62	68	68
	Thermal Protection Type		Inner	Inner	Inner
	Crankcase	W	40 ~ 80	40 ~ 80	40 ~ 80
	Refrigerant Oil	ml	FVC68D / 500	FVC68D / 500	FVC68D / 500

Specification & Performance

Fan Motor	Model		WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4
	Quantity		1	1	2
	Type		DC Inverter	DC Inverter	DC Inverter
	Brand		Panasonic	Panasonic	Panasonic
	Insulation Class		E	E	E
	Safety Class		IP23	IP23	IP23
	Input	W	465 ± 25	465 ± 25	465 ± 25 (x2)
	Output	W	750	750	750 (x2)
	Rated Current	A	4.4	4.4	4.4 (x2)
	Speed	rpm	1,000 ± 10	1,000 ± 10	1,000 ± 10 (x2)
Fan	Material		Plastic	Plastic	Plastic
	Quantity		1	1	2
	Type		Axial	Axial	Axial
	No. of Blade		3	3	3
	Dimension (Dia. X H)	mm	700 x 202	700 x 202	560 x 189
Coil	Number of Rows		2	2	2
	Tube Pitch (a) x Row Pitch (b)	mm	25.4 x 22	25.4 x 22	25.4 x 22
	Fin Spacing	mm	1.6	1.6	1.6
	Fin Type		Hydrophilic Aluminum		
	Tube Outside Diameter	mm	Φ7.94	Φ7.94	Φ7.94
	Tube Type		Inner Groove		
	Coil Length x Height	mm	1,924.5 x 1,252.5	1,924.5 x 1,252.5	2,661.5 x 1,252.5
	Number of Circuits		22	22	22
Air Flow		m^3/h	11,700	11,700	15,600
External Static Pressure		Pa	"0 ~ 20 (Default) 20 ~ 81.8 (Optional)"	"0 ~ 20 (Default) 20 ~ 81.8 (Optional)"	"0 ~ 20 (Default) 20 ~ 81.8 (Optional)"
Sound Pressure Level (*3)			57	57	58
Unit Dimension	Uncrated (H x W x D)	mm	1,615 x 960 x 765	1,615 x 960 x 765	1,615 x 1,250 x 765
	Crated (H x W x D)	mm	1,790 x 1,025 x 830	1,790 x 1,025 x 830	1,790 x 1,305 x 830
	Net / Gross Weight	kg	245 / 260	245 / 260	285 / 305
Refrigerant	Type		R410A		
	Charge	kg	10	10	12
Expansion Device			EXV	EXV	EXV
Design Pressure		Mpa	4.4/2.6	4.4/2.6	4.4/2.6

Refrigerant Piping	Liquid	in (mm)	Φ1/2 (12.7)	Φ1/2 (12.7)	Φ1/2 (12.7)
	Gas	in (mm)	Φ1 (25.4)	Φ1 (25.4)	Φ1 (25.4)
	Oil	in (mm)	Φ1/4 (6.35)	Φ1/4 (6.35)	Φ1/4 (6.35)
	Total Piping Length (≤30HP)	m	350	350	350
	Total Piping Length (>30HP)	m	500	500	500
	The Farthest Piping Length (Actual)	m	150	150	150
	The Farthest Piping Length (Equivalent)	m	175	175	175
	The Farthest Piping Length from the First Distributor	m	40	40	40
	Max. Vertical Piping Length (OD is above ID)[6]	m	70*	70*	70*
	Max. Vertical Piping Length (OD is below ID)	m	70	70	70
	Max. Vertical Piping Length (between ID)	m	15	15	15
Wire Size	Power wiring	mm^2	4×10+10 (L≤20m); 4×16+10 (L≤50m)		
	Signal wiring	mm^2	3-core shielded wires with diameter ≥ 0.75 (3 x 0.75)		
Operation Temperature		°C	-5 ~ 48 for Cooling; -20 ~ 21 for Heating		

Note:

- *1. Nominal cooling capacities are based on the following conditions: return air temp.: 27°CDB, 19°CWB, outdoor temp.: 35°CDB, and equivalent ref. piping: 5m (horizontal).*
- *Nominal heating capacities are based on the following conditions: return air temp.: 20°CDB, outdoor temp.: 7°CDB, 6°CWB, andequivalent ref. piping: 5m (horizontal).*
- *Sound level: Anechoic chamber conversion value, measured at a point of 1m in front of the unit at a height of 1.5m. During actual operation, these values are normally somewhat higher as aresult of ambient conditions.*
- *It's the dimension of connecting pipes between outdoor and first branch joint when the Max. equivalent length of tubing is less than 90m.*
- *The above data may be changed without notice for future improvement on quality and performance.*
- *The standard maximum vertical piping length when the outdoor unit is above indoor unit is 50m. To achieve 70m, the units must be requested in advance.*

Table 2

Trane Model			4TVH0135AD000AA	4TVH0155AD000AA
Power Supply		V/ph/Hz	380-415/3/50	380-415/3/50
Cooling (*1)	Capacity	W	40.0	45.0
	Input	W	12,307	14,019
	EER	W/W	3.25	3.21
Heating (*2)	Capcity	kW	45.0	50.0
	Input	W	11,194	12,788
	COP	W/W	4.02	3.91
Max. Power Input		kW	20.7	20.7
Max. Current		A	33.0	33.0
DC Inverter Compressor	Model		E405DHD-36D2YG	E405DHD-36D2YG
	Quantity		1	1
	Type		DC Inverter	DC Inverter
	Brand		Hitachi	Hitachi
	Capacity	kW	11.8	11.8
	Input	kW	5.1	5.1
	Power Supply	V/ph/Hz	380-415/3/50	380-415/3/50
	Operating Frequency	Hz	60 ~ 180	60 ~ 180
	Crankcase	W	40 ~ 80	40 ~ 80
	Refrigerant Oil	ml	FVC68D / 500	FVC68D / 500
Fixed Speed Compressor	Model		E605DH-59D2YG	E655DH-65D2YG (GC)
	Quantity		2	2
	Type		Scroll	Scroll
	Brand		Hitachi	Hitachi
	Capacity	kW	15.4 (x2)	17.1 (x2)
	Input	kW	5.13 (x2)	5.74 (x2)
	Power Supply	V/ph/Hz	380-415/3/50	380-415/3/50
	LRA	A	62 (x2)	68 (x2)
	Thermal Protection Type		Inner	Inner
	Crankcase	W	40 ~ 80 (x2)	40 ~ 80 (x2)
	Refrigerant Oil	ml	FVC68D / 500 (x2)	FVC68D / 500 (x2)

Fan Motor	Model		WZDK750-38G-4	WZDK750-38G-4
	Quantity		2	2
	Type		DC Inverter	DC Inverter
	Brand		Panasonic	Panasonic
	Insulation Class		E	E
	Safety Class		IP23	IP23
	Input	W	465 ± 25 (x2)	465 ± 25 (x2)
	Output	W	750 (x2)	750 (x2)
	Rated Current	A	4.4 (x2)	4.4 (x2)
	Speed	rpm	1,000 ± 10 (x2)	1,000 ± 10 (x2)
Fan	Material		Plastic	Plastic
	Quantity		2	2
	Type		Axial	Axial
	No. of Blade		3	3
	Dimension (Dia. X H)	mm	560 x 189	560 x 189
Coil	Number of Rows		2	2
	Tube Pitch (a) x Row Pitch (b)	mm	25.4 x 22	25.4 x 22
	Fin Spacing	mm	1.6	1.6
	Fin Type			
	Tube Outside Diameter	mm	φ 7.94	φ 7.94
	Tube Type			
	Coil Length x Height	mm	2,661.5 x 1,252.5	2,661.5 x 1,252.5
	Number of Circuits		22	22
Air Flow		m^3/h	15,600	15,600
External Static Pressure		Pa	"0 ~ 20 (Default) 20 ~ 81.8 (Optional)"	"0 ~ 20 (Default) 20 ~ 81.8 (Optional)"
Sound Pressure Level (*3)			60	60
Unit Dimension	Uncrated (H x W x D)	mm	1,615 x 1,250 x 765	1,615 x 1,250 x 765
	Crated (H x W x D)	mm	1,790 x 1,305 x 830	1,790 x 1,305 x 830
	Net / Gross Weight	kg	325 / 355	325 / 355
Refrigerant	Type		R410A	
	Charge	kg	15	15
Expansion Device			EXV	EXV
Design Pressure		Mpa	4.4/2.6	

Refrigerant Piping	Liquid	in (mm)	Φ5/8 (15.9)	Φ5/8 (15.9)
	Gas	in (mm)	Φ1 1/4 (31.8)	Φ1 1/4 (31.8)
	Oil	in (mm)	Φ1/4 (6.35)	Φ1/4 (6.35)
	Total Piping Length (≤30HP)	m	350	350
	Total Piping Length (>30HP)	m	500	500
	The Farthest Piping Length (Actual)	m	150	150
	The Farthest Piping Length (Equivalent)	m	175	175
	The Farthest Piping Length from the First Distributor	m	40	40
	Max. Vertical Piping Length (OD is above ID)[6]	m	70*	70*
	Max. Vertical Piping Length (OD is below ID)	m	70	70
	Max. Vertical Piping Length (between ID)	m	15	15
Wire Size	Power wiring	mm^2	4×16+16 (L≤20m); 4×25+16 (L≤50m)	
	Signal wiring	mm^2	3-core shielded wires with diameter ≥ 0.75 (3 x 0.75)	
Operation Temperature		°C	-5 ~ 48 for Cooling; -20 ~ 21 for Heating	

Note:

- *1. Nominal cooling capacities are based on the following conditions: return air temp.: 27°CDB, 19°CWB, outdoor temp.: 35°CDB, and equivalent ref. piping: 5m (horizontal).*
- *Nominal heating capacities are based on the following conditions: return air temp.: 20°CDB, outdoor temp.: 7°CDB, 6°CWB, andequivalent ref. piping: 5m (horizontal).*
- *Sound level: Anechoic chamber conversion value, measured at a point of 1m in front of the unit at a height of 1.5m. During actual operation, these values are normally somewhat higher as aresult of ambient conditions.*
- *It's the dimension of connecting pipes between outdoor and first branch joint when the Max. equivalent length of tubing is less than 90m.*
- *The above data may be changed without notice for future improvement on quality and performance.*
- *The standard maximum vertical piping length when the outdoor unit is above indoor unit is 50m. To achieve 70m, the units must be requested in advance.*

Dimensions

Units Dimension

Figure 1

4TVH0086-0096 Dimensions

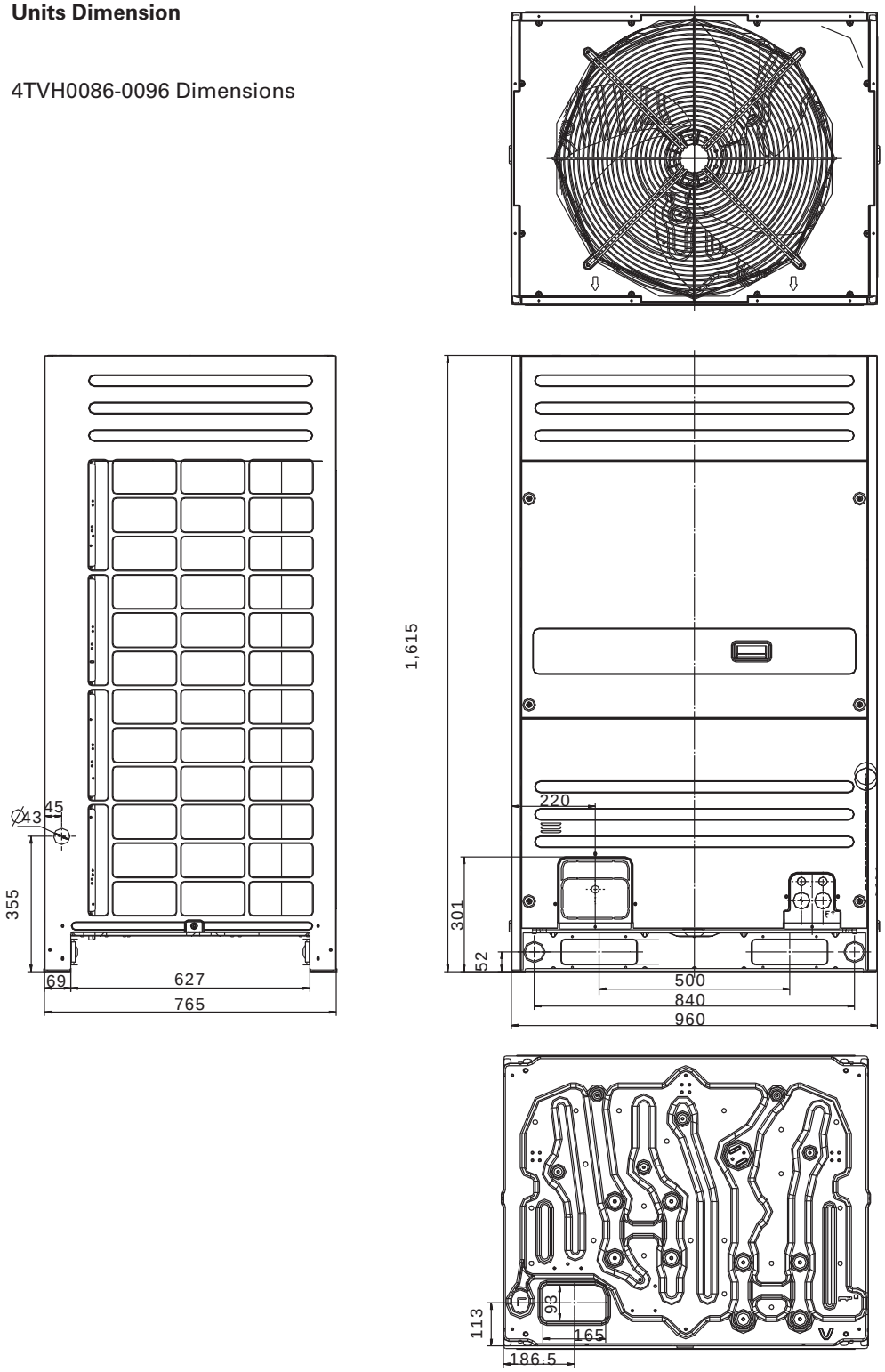


Figure 2

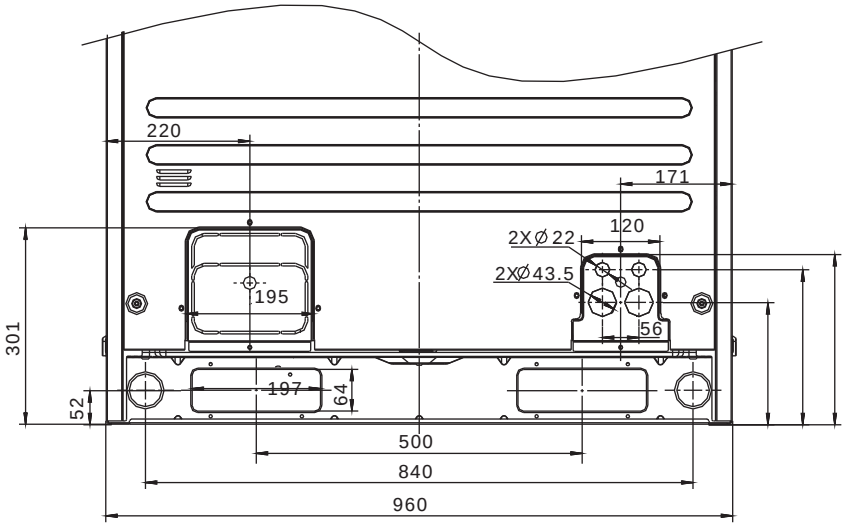


Figure 3

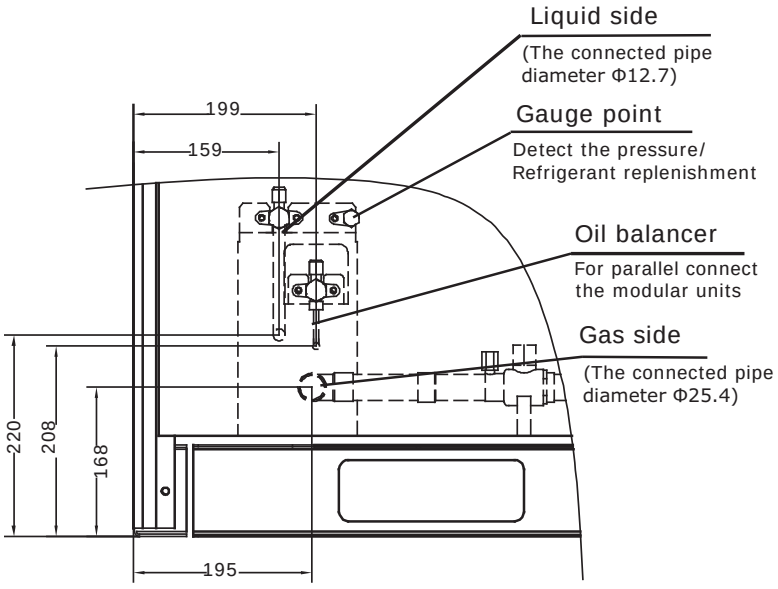


Figure 4

Position of foot screw bolt (Unit: mm)

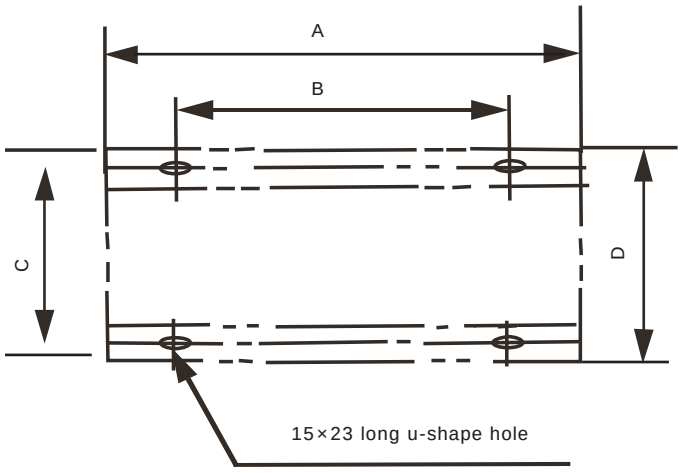


Table 3

	4TVH0086-0096	4TVH0115-0155
A	700	1,120
B	960	1,250
C	736	736
D	765	765

4TVH0115-0155

Figure 5

Dimensions:

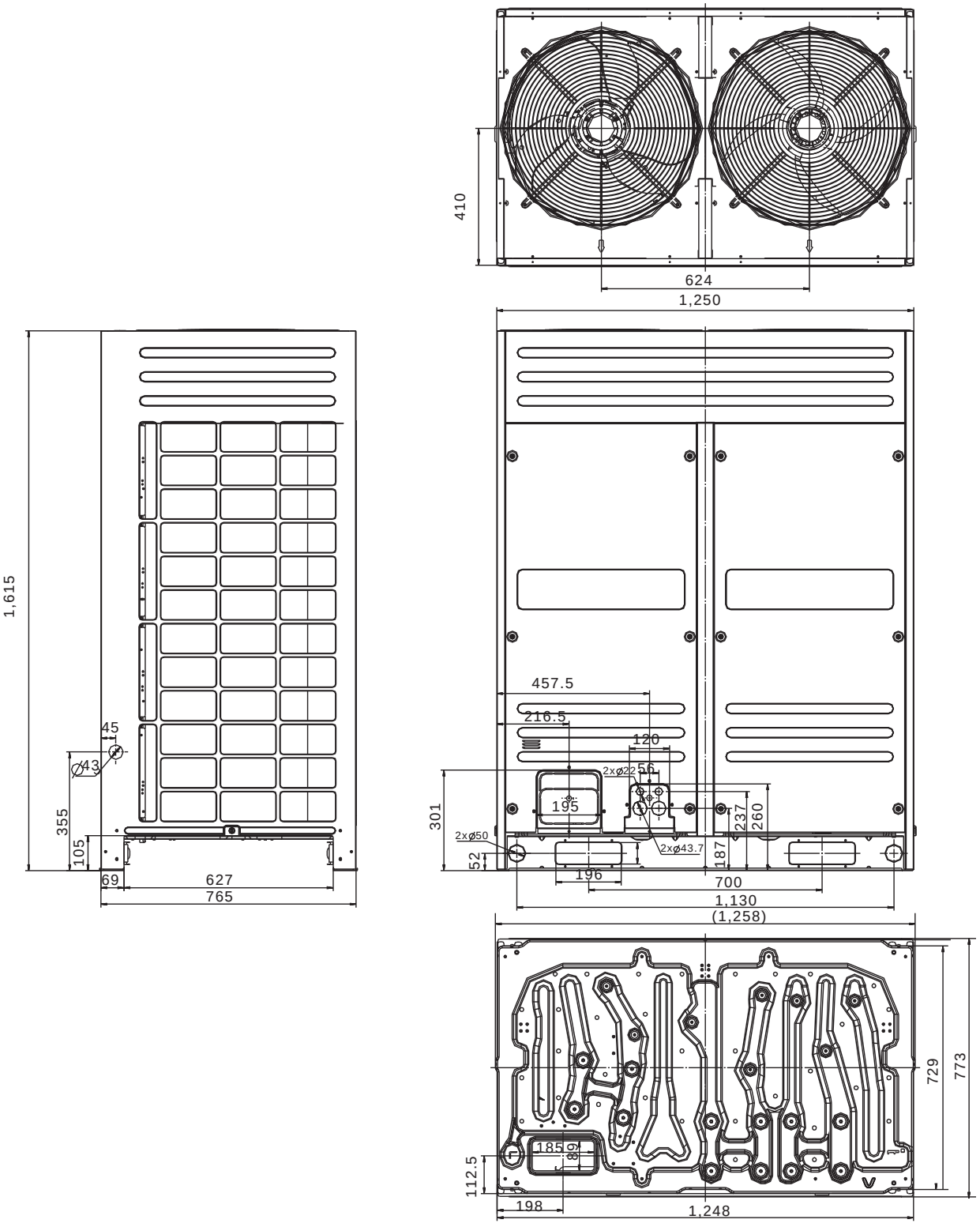


Figure 6

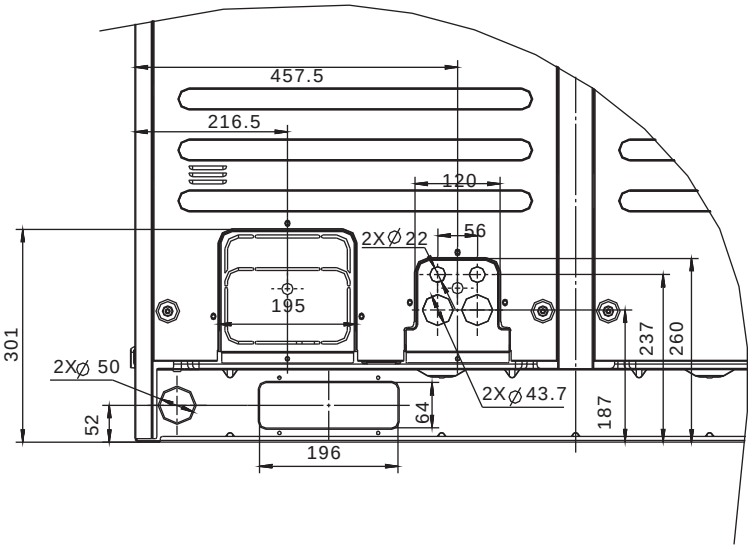
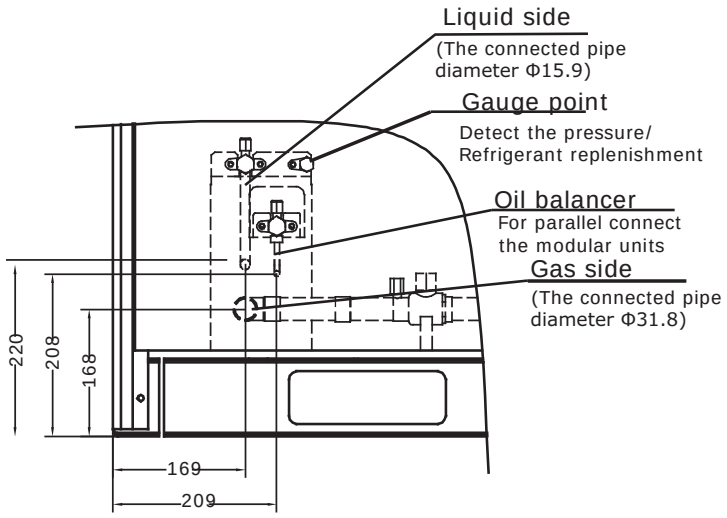
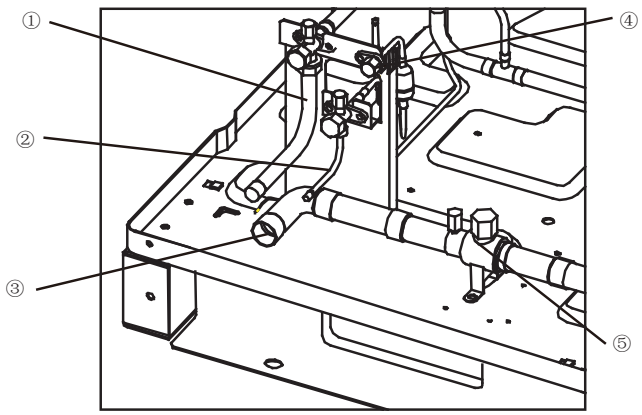


Figure 7



Valve explanation

Figure 8



① Connect the liquid pipe (accessory, field installation)

② Oil balance pipe (only for combination)

③ Connect the gas pipe

④ Low pressure float valve

⑤ Low pressure float valve

Piping Diagram

Figure 9

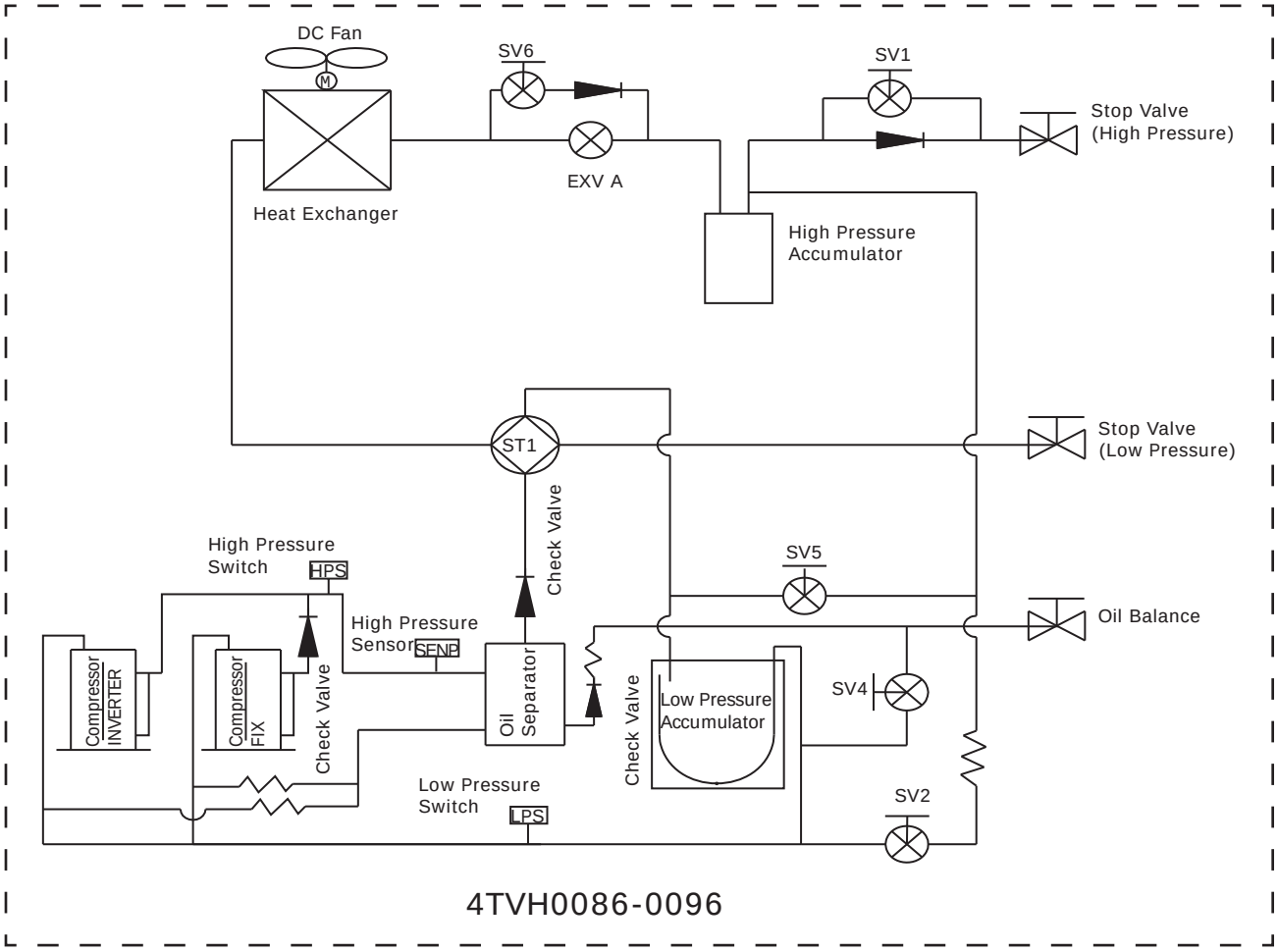
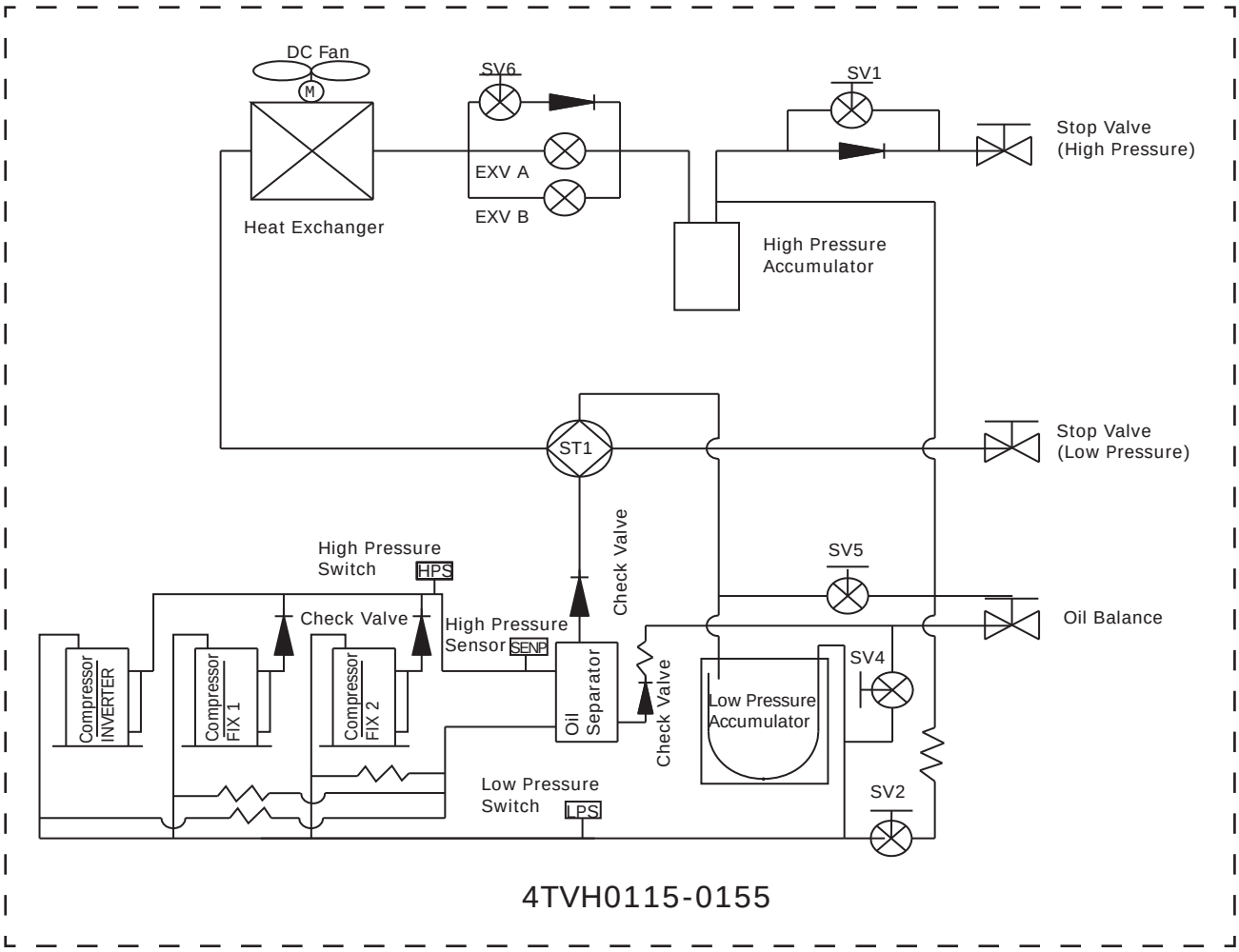


Figure 10


DC Fan
M
SV6
SV1
Stop Valve
(High Pressure)
EXV A
EXV B
Heat Exchanger
High Pressure
Accumulator
ST1
Stop Valve
(Low Pressure)
High Pressure
Switch
HPS
Check Valve
SV5
Check Valve
High Pressure
Sensor
SENP
Oil Balance
SV4
Compressor
INVERTER
Compressor
FIX 1
Compressor
FIX 2
Oil
Separator
Check Valve
Low Pressure
Accumulator
Low Pressure
Switch
LPS
SV2
4TVH0115-0155

Remark:
- There are 3 pieces of discharge temp. sensor in total in addition to the top sensor of 2 fixed speed comp.
- There're pipe temperature sensor

Key Components:
Oil Separator: is used to separate oil from high pressure & temperature gas refrigerant that is pumped out from compressor. The separation efficiency is up to 99%, making the oil return back to each compressor very soon.

Liquid accumulator: It is used to store the over-full liquid refrigerant, and guarantee the refrigerant from the outdoor to indoor unit is in liquid status.

Gas-liquid separator: It is used to store the liquid refrigerant and oil, which can protect the compressor from liquid hammer.

Four-way valve control (ST1): closed in cooling mode and open in heating mode

EXV (electromagnetic expansion valve) control:
- Max. Open degree is 480 pulses.
- Generally when system is electrified, the EXV closes 700 pulse first, then opens to 350 pulse and stand by. When the unit is started, it opens to the right pulse.
- When the running outdoor unit receives OFF signal, the EXV of auxiliary unit will stop while main unit is running and auxiliary unit is stopped at the same time. If all outdoor units are stopped, the EXV will close first, and then open to the pulse of stand-by.
- 4TVH0086-0115 have one EXV; 4TVH0135-0155 have double EXVs

SV1: cut off the refrigerant between outdoor units in one combination.
When the outdoor unit startup, the SV1 opens immediately. When the outdoor unit stops, the SV1 closes immediately.
SV2: for spraying a little liquid refrigerant to cool compressor down. It will open automatically when any compressordischarge temperature is higher than 100°C.
SV4: oil returning valve. Opens after the DC inverter compressor has run for 5 minutes and then closes 15 minutes later. (For the system with only one outdoor unit).
Every 20 minutes, SV4 of each outdoor unit opens for 3 minutes. (For the system with more than one outdoor unit)
SV5: for defrosting. In defrosting mode, the opening of SV5 can cut the refrigerant flowing circle, so the defrosting process will take less time. It is always off in cooling mode.
SV6: for by-pass. It is off when the unit stands by or in heating mode; while it is on when the discharge temperature is over-high in cooling mode.

Hi pressure sensor: To monitor the discharge pressure of the compressor and control the DC fan speed.

Electrical Characteristics

Table 4

Model	Outdoor Unit				Power Supply			Compressor		OFM	
	Hz	Voltage	Min.	Max.	MCA	TOCA	MFA	MSC	RLA	KW	FLA
4TVH0086AD000AA	50	380~415	342	440	29	75	50	62	8.7+8.8	0.75	4.4
4TVH0096AD000AA	50	380~415	342	440	30	75	50	68	8.7+9.8	0.75	4.4
4TVH0115AD000AA	50	380~415	342	440	36	75	50	68	8.7+9.8	0.75×2	4.4×2
4TVH0140AD000AA	50	380~415	342	440	46	100	70	62×2	8.7+8.8×2	0.75×2	4.4×2
4TVH0155AD000AA	50	380~415	342	440	49	100	70	68×2	8.7+9.8×2	0.75×2	4.4×2

Remark:

MCA: Min. Current Amps. (A)
TOCA: Total Over-current Amps. (A)
MFA: Max. Fuse Amps. (A)
MSC: Max. Starting Amps. (A)
RLA: Rated Locked Amps. (A)
OFM: Outdoor Fan Motor.
FLA: Full Load Amps. (A)
kW: Rated Motor Output (kW)

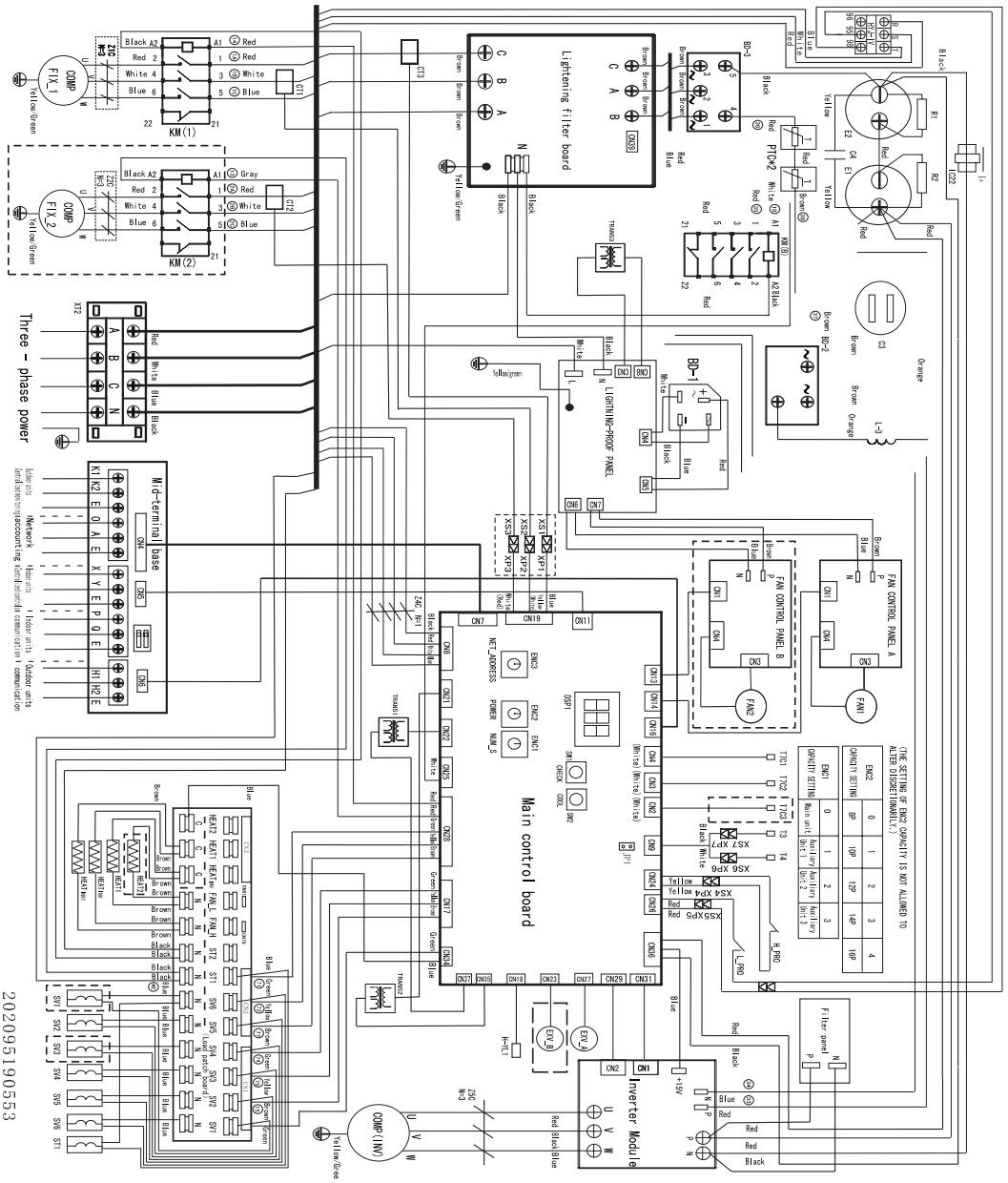
Notes:

- *RLA is based on the following conditions, Indoor temp. 27°C DB/19°C WB, Outdoor temp. 35°C DB*
- *TOCA means the total value of each OC set.*
- *MSC means the Max. current during the starting of compressor.*
- *Voltage range. Units are suitable for use on electrical systems where voltage supplied to unit terminals is within the listed range limits.*
- *Maximum allowable voltage variation between phases is 2%*
- *Select wire size based on the larger value of MCA or TOCA*
- *MFA is used to select the circuit breaker and the ground fault circuit interrupter (earth circuit breaker).*

Wiring Diagram and Field Wiring

Wiring Diagrams for 4TVH0086-0155

Figure 11



Code	Name
COMP (INV)	Inverter compressor
COMP FIX_1,2	Fixed compressor
FAN1,FAN2	Fan
ST1	Main 4-way valve
KM (1,2,B)	Contactor
XT2	Big 4-phase terminal
L-PRO	Low-pressure switch
H-PRO	High-pressure switch
EXV_A, EXV_B	Electronic expansion valve
XS1-XS8	Middle terminal
XP1-XP8	Middle terminal
T3	Pipe temp sensor
T4	Outdoor temp sensor
T7C1	Discharge temp sensor, inverter compressor
T7C2,T7C3	Discharge temp sensor, fixed compressor
H-YL1	Pressure Sensor
PTC	Thermal resistor
CT1-CT3, IC22	Current inductor
TRANS1-TRANS3	Power transformer
BD-1	Brigde rectifier
BD-2	Single-phase bridge
BD-3	3-phase bridge
E1,E2,C3,C4	Filter capacitor
L-3	Reactor
SV1-SV6	Solenoid valve
R1,R2	Cement resistor
HEAT (1,2,INV,) INV1	Crankcase heater

DSP1	
E0	Outdoor unit COMM error
E1	Phase protection
E2	COMM error with indoor unit
E4	Outdoor temp sensor error
E8	Outdoor unit address error
E9	Power volt. Error
H0	COMM error between 1#341 and 780034
H1	COMM error between 0537 and 780034
H2	Qty of outdoor unit decreases
H3	Qty of outdoor unit increases
H4	3 times of P6 protect in 30 minutes
H5	3 times of P2 protect in 30 minutes
H6	3 times of P4 protect in 100 minutes
H7	Qty of indoor unit decreases
P0	Inverter compressor top temp protection
P1	Hi-pressure protection
P2	Low-pressure protection
P3	Compressor cur. Protection
P4	Compressor discharge temp protection
P5	Outdoor condenser hi temp protection
P6	Inverter module protection
P7	Current protection, No.1 fixed compressor
P8	Current protection, No.2 fixed compressor
P9	Fan Protection
dF	Defrost
d0	Oil return

The description of JP1 switch setting	
0	Default setting before shipping; OFF
1	Detection setting: ON

Field Wiring

Figure 12

Terminal of outdoor unit:

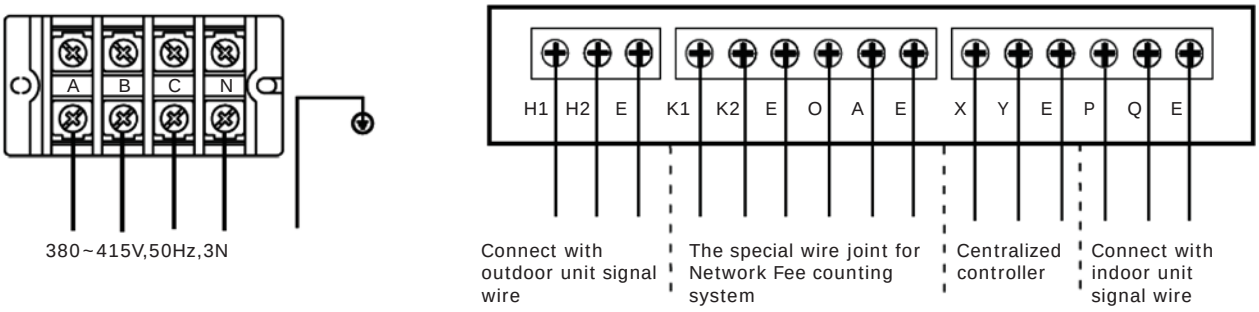
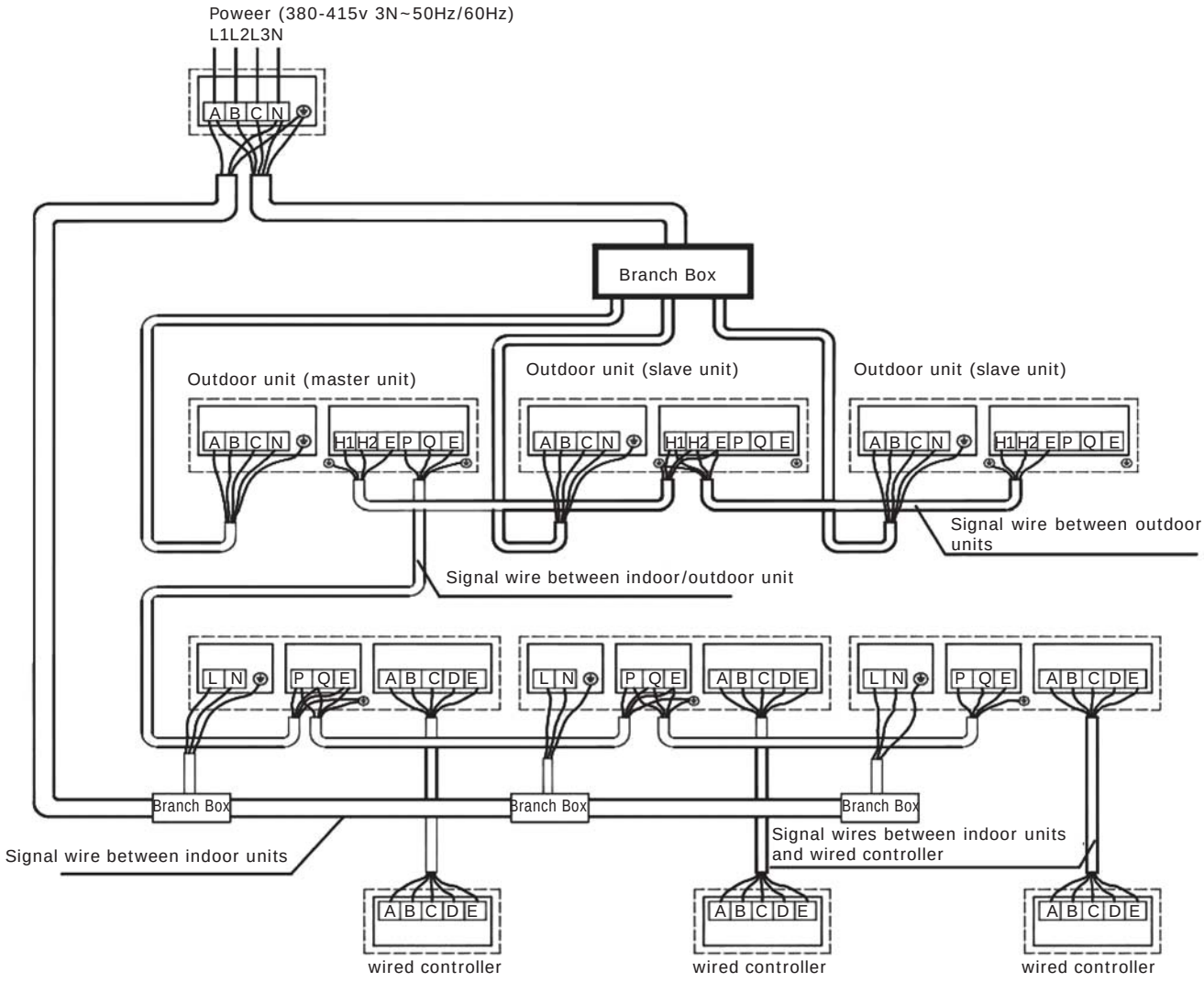


Figure 13

Wiring between indoor and outdoor units



Note:

- *The signal connecting line between outdoor units, indoor and outdoor units and indoor units has polarity. When connecting, be careful to prevent error connection.*
- *Signal line shall adopt three-core shielded wire with an area above 0.75mm².*
- *Do not bind signal line and copper pipe together with belting.*
- *Make sure that the shield metal layer should be grounded well indoor control box in order to prevent interference.*
- *it's fobbiden to connect 200V or above high-volt live wire to the communication terminal.*

Outdoor unit power wiring

Separate Power Supply (without power facility)

Table 5

Item / Model	Power supply	Minimum Power wire diameter (mm²) Wiring of mental and synthetic resin		Manual switch (A)		Creepage breaker
		Size	Ground wire	Capacity	Fuse	
4TVH0086AD000AA	380V~415V, 3N, 50Hz	10 (L≤29m) 16 (L≤46m) 25 (L≤78m)	16	60	50	100mA under 0.1sec
4TVH0096AD000AA						
4TVH0086AD000AA						
4TVH0096AD000AA		10 (L≤29m) 25 (L≤46m) 35 (L≤78m)	16	80	70	
4TVH0140AD000AA						

With power facilities:

Figure 14

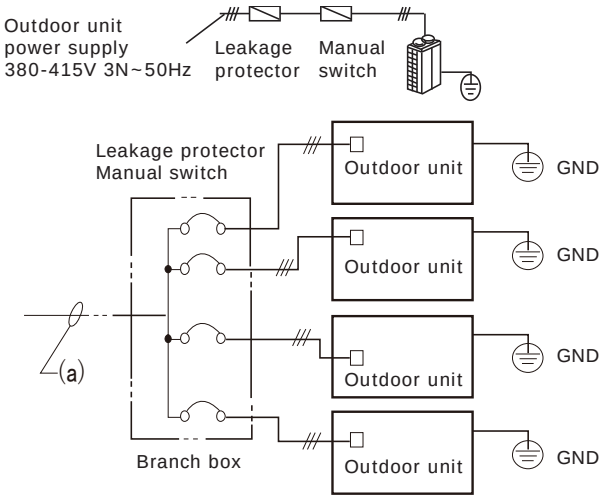
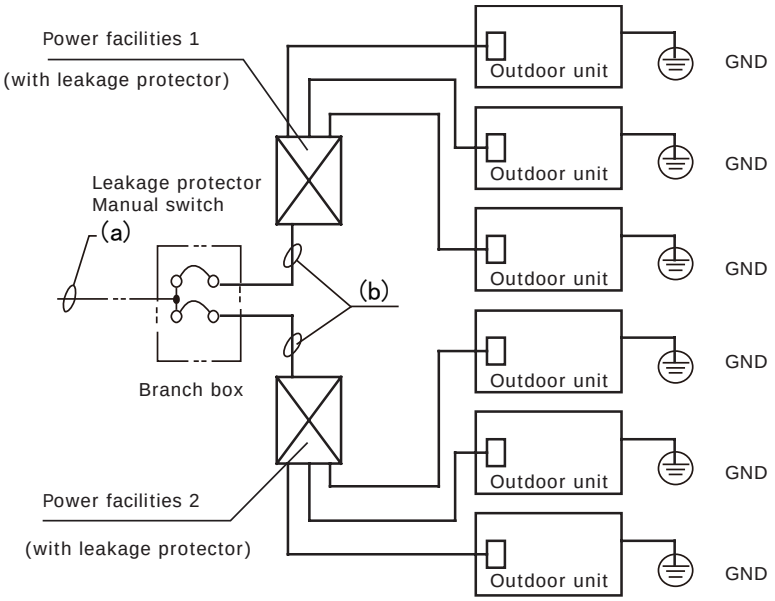


Figure 15



Note:

- *Select power cord for these five models separately according to relevant standard. 4TVH0086-0155*
- *The wiring diameter and the length in the table indicate the condition that the voltage dropping range is within 2%. If the length exceeds the above figure, please select the wire diameter according to relevant standard.*
- *Select the wire diameter Power wiring refer to the main wire (a) connecting to branch box and the wiring (b) between branch box and power facilities. Please select the wire diameter according to the following requirement.*
- *Diameter of main wire (a) Depends on the total horsepower of outdoor unit and following table. E.g In system: (8HP×1unit+8HP×1unit+10HP×1unit) Total HP=26HP→(Table.6)→size of wire=35mm^2 (within 50m)*
- *Wiring (b): between branch box and power equipment. Depends on the number of combined outdoor unit. If fewer than 5, the diameter is the same as that of main wire (a); if more than 6, there will be 2 electric control boxes, and the diameter of wiring depends on the total horsepower of outdoor units connecting to each electric control box and following table.*

Reference table of the cable size for each capacity

Table 6

Model	Total Capacity (HP)	Minimum diameter of wiring (mm^2) from weather proof isolator to ODU	
		Below 20m	20 to 50m
4TVH0086	8	10	16
4TVH0096	10	10	16
4TVH0115	12	10	16
4TVH0135	14	16	25
4TVH0155	16	16	25
4TVH0182	18	16	25
4TVH0192	20	16	25
4TVH0211	22	16	25
4TVH0231	24	25	35
4TVH0251	26	25	35
4TVH0270	28	25	35
4TVH0290	30	35	50
4TVH0310	32	35	50
4TVH0327	34	35	50
4TVH0347	36	35	50
4TVH0366	38	35	50
4TVH0386	40	35	50
4TVH0405	42	50	70
4TVH0425	44	50	70
4TVH0445	46	50	70
4TVH0465	48	50	70
4TVH0492	50	70	95
4TVH0502	52	70	95
4TVH0521	54	70	95
4TVH0541	56	70	95
4TVH0560	58	70	95
4TVH0580	60	70	95
4TVH0600	62	70	95
4TVH0620	64	70	95

Remark:

The above table is just for reference. In actual situation, many factors such as cable layout, space between cable and surroundings and so on have to be taken into consideration.

Operation Limits

Figure 16

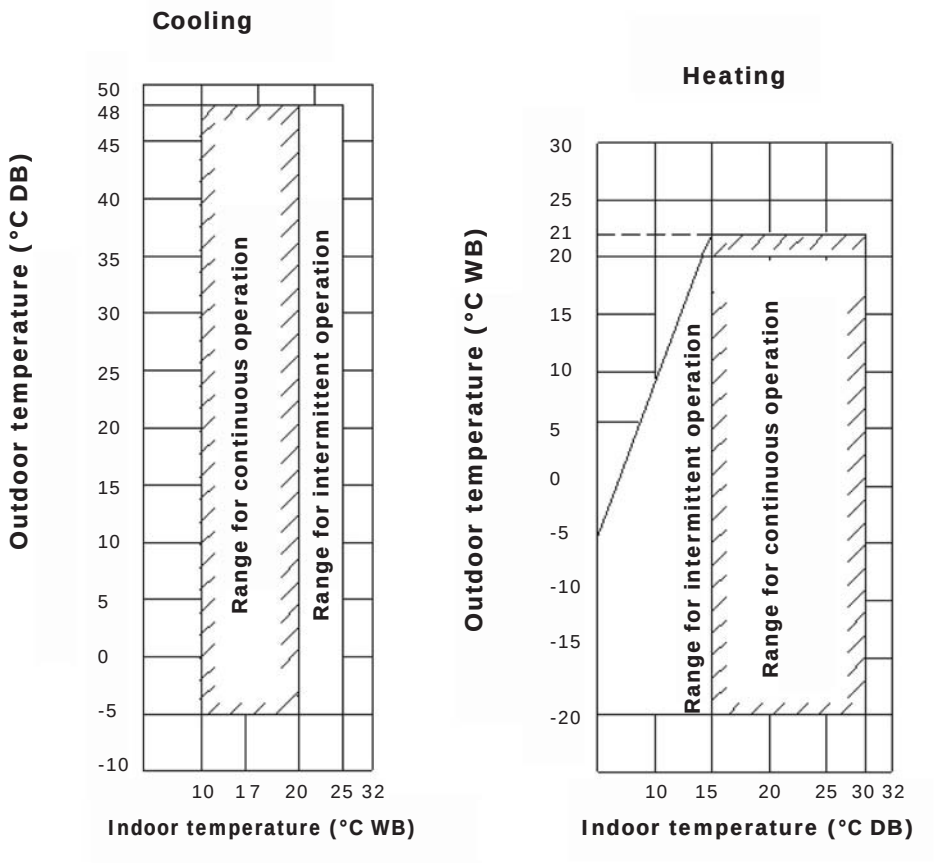


Table 7

	Outdoor temp.	Indoor temp.	Room relative humidity
Cooling mode	-5°C ~ 48°C	17°C ~ 32°C	below 80%
Heating mode	-20°C ~ 21°C	15°C ~ 30°C	————

Notes:

- *If the unit is running beyond the above condition, protective device will inactivate and then the units will shift to abnormal operation.*
- *These figures base on the operation conditions between indoor units and outdoor units: Equivalent pipe length is 5m, and height difference is 0m.*

  Precaution:

  The indoor relative humidity should be lower than 80%. If the air conditioner works in an environment with a relative humidity higher than mentioned above, the surface of the air conditioner may condensate. In this case, it is recommended to set the air speed of the indoor unit to high.

Capacity Table

Cooling Mode: 4TVH0086

Table 8

TC: Total Capacity (kW) **WB:** Wet-bulb Temperature **DB:** Dry-bulb Temperature **PI:** Power Input (kW)

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
130%	10.0	22.14	2.71	26.37	3.31	30.60	3.93	31.77	4.02	32.13	3.94	32.94	3.78	33.75	3.60
	12.0	22.14	2.78	26.37	3.37	30.60	4.01	31.32	4.00	31.77	3.92	32.49	3.74	33.30	3.69
	14.0	22.14	2.81	26.37	3.44	30.51	4.06	30.96	4.01	31.32	3.90	32.13	3.86	32.94	3.90
	16.0	22.14	2.86	26.37	3.51	30.15	4.05	30.51	3.98	30.87	4.03	31.68	4.07	32.49	4.11
	18.0	22.14	2.91	26.37	3.58	29.70	4.20	30.06	4.22	30.51	4.24	31.32	4.28	32.13	4.32
	20.0	22.14	2.98	26.37	3.81	29.25	4.40	29.70	4.43	30.06	4.45	30.87	4.49	31.68	4.54
	21.0	22.14	3.06	26.37	3.94	29.07	4.51	29.52	4.53	29.88	4.55	30.69	4.60	31.50	4.64
	23.0	22.14	3.28	26.37	4.23	28.71	4.71	29.07	4.73	29.43	4.76	30.24	4.81	31.05	4.85
	25.0	22.14	3.50	26.37	4.53	28.26	4.92	28.62	4.94	29.07	4.97	29.88	5.02	30.69	5.07
	27.0	22.14	3.74	26.37	4.85	27.90	5.12	28.26	5.15	28.62	5.18	29.43	5.23	30.24	5.29
	29.0	22.14	3.99	26.37	5.18	27.45	5.33	27.81	5.36	28.26	5.39	29.07	5.45	29.88	5.50
	31.0	22.14	4.26	26.28	5.48	27.00	5.54	27.45	5.57	27.81	5.60	28.62	5.66	29.43	5.72
	33.0	22.14	4.54	25.83	5.68	26.64	5.75	27.00	5.78	27.45	5.81	28.26	5.87	28.98	5.94
	35.0	22.14	4.84	25.38	5.89	26.19	5.96	26.64	5.99	27.00	6.03	27.81	6.10	28.62	6.16
	37.0	22.14	5.15	25.02	6.10	25.83	6.18	26.19	6.21	26.64	6.25	27.36	6.32	28.17	6.39
	39.0	22.14	5.48	24.57	6.17	25.38	6.38	25.83	6.42	26.19	6.46	27.00	6.53	27.81	6.61
	42.0	22.14	5.77	24.32	6.23	25.11	6.44	25.56	6.48	25.92	6.52	26.73	6.54	26.74	6.67
	44.0	22.14	6.06	24.06	6.29	24.85	6.48	25.30	6.54	25.39	6.54	25.76	6.57	26.11	6.70
	46.0	22.14	6.35	23.96	6.35	24.58	6.56	25.03	6.56	25.18	6.58	25.31	6.59	25.71	6.92
120%	10.0	20.43	2.47	24.30	3.02	28.26	3.59	30.24	3.88	31.68	4.05	32.40	3.89	33.12	3.74
	12.0	20.43	2.52	24.30	3.07	28.26	3.66	30.24	3.95	31.23	4.02	31.95	3.87	32.67	3.71
	14.0	20.43	2.57	24.30	3.14	28.26	3.73	30.24	4.03	30.78	4.00	31.59	3.85	32.31	3.87
	16.0	20.43	2.61	24.30	3.20	28.26	3.80	30.06	4.06	30.42	4.01	31.14	4.05	31.86	4.08
	18.0	20.43	2.66	24.30	3.26	28.26	3.93	29.61	4.20	29.97	4.21	30.69	4.25	31.50	4.29
	20.0	20.43	2.72	24.30	3.39	28.26	4.23	29.25	4.40	29.61	4.42	30.33	4.46	31.05	4.50
	21.0	20.43	2.74	24.30	3.51	28.26	4.38	28.98	4.50	29.34	4.52	30.15	4.56	30.87	4.61
	23.0	20.43	2.93	24.30	3.76	28.26	4.69	28.62	4.70	28.98	4.73	29.70	4.77	30.42	4.81
	25.0	20.43	3.13	24.30	4.02	27.81	4.89	28.17	4.91	28.53	4.93	29.34	4.98	30.06	5.03
	27.0	20.43	3.34	24.30	4.30	27.45	5.09	27.81	5.12	28.17	5.15	28.89	5.19	29.61	5.24
	29.0	20.43	3.56	24.30	4.59	27.00	5.30	27.36	5.33	27.72	5.35	28.44	5.41	29.25	5.45
	31.0	20.43	3.80	24.30	4.90	26.55	5.51	27.00	5.53	27.36	5.57	28.08	5.62	28.80	5.68
	33.0	20.43	4.05	24.30	5.23	26.19	5.72	26.55	5.75	26.91	5.77	27.63	5.83	28.35	5.89
	35.0	20.43	4.31	24.30	5.57	25.74	5.92	26.10	5.95	26.55	5.98	27.27	6.05	27.99	6.11
	37.0	20.43	4.58	24.30	5.94	25.38	6.14	25.74	6.17	26.10	6.20	26.82	6.26	27.54	6.33
	39.0	20.43	4.88	24.21	6.27	24.93	6.34	25.29	6.38	25.65	6.41	26.46	6.48	27.18	6.55
	42.0	20.43	5.05	23.95	6.33	24.67	6.40	25.03	6.44	25.39	6.47	26.20	6.51	26.14	6.61
	44.0	20.43	5.11	23.82	6.39	24.41	6.45	24.77	6.46	25.13	6.49	25.42	6.53	25.84	6.84
	46.0	20.43	5.17	23.69	6.45	24.20	6.52	24.51	6.56	24.95	6.57	25.15	6.55	25.61	6.90

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
110%	10.0	18.72	2.24	22.32	2.73	25.92	3.25	27.72	3.51	29.52	3.78	31.77	4.01	32.49	3.87
	12.0	18.72	2.29	22.32	2.79	25.92	3.31	27.72	3.58	29.52	3.85	31.41	3.99	32.04	3.85
	14.0	18.72	2.33	22.32	2.83	25.92	3.37	27.72	3.64	29.52	3.92	30.96	3.97	31.68	3.84
	16.0	18.72	2.37	22.32	2.89	25.92	3.44	27.72	3.71	29.52	4.00	30.60	4.01	31.23	4.05
	18.0	18.72	2.41	22.32	2.95	25.92	3.51	27.72	3.82	29.52	4.19	30.15	4.22	30.87	4.26
	20.0	18.72	2.46	22.32	3.01	25.92	3.71	27.72	4.10	29.07	4.39	29.79	4.43	30.42	4.47
	21.0	18.72	2.49	22.32	3.10	25.92	3.85	27.72	4.25	28.89	4.50	29.52	4.53	30.24	4.57
	23.0	18.72	2.60	22.32	3.32	25.92	4.12	27.72	4.56	28.44	4.69	29.16	4.74	29.79	4.78
	25.0	18.72	2.78	22.32	3.55	25.92	4.41	27.72	4.88	28.08	4.90	28.71	4.95	29.43	4.99
	27.0	18.72	2.96	22.32	3.79	25.92	4.72	27.27	5.09	27.63	5.11	28.35	5.15	28.98	5.20
	29.0	18.72	3.16	22.32	4.05	25.92	5.04	26.91	5.30	27.27	5.32	27.90	5.37	28.62	5.42
	31.0	18.72	3.36	22.32	4.31	25.92	5.38	26.46	5.50	26.82	5.53	27.54	5.57	28.17	5.63
	33.0	18.72	3.58	22.32	4.60	25.74	5.68	26.10	5.71	26.46	5.73	27.09	5.79	27.81	5.84
	35.0	18.72	3.81	22.32	4.90	25.29	5.88	25.65	5.91	26.01	5.95	26.64	6.00	27.36	6.06
	37.0	18.72	4.05	22.32	5.22	24.93	6.10	25.29	6.12	25.56	6.15	26.28	6.21	26.91	6.27
	39.0	18.72	4.31	22.32	5.56	24.48	6.30	24.84	6.33	25.20	6.37	25.83	6.43	26.55	6.49
	42.0	18.72	4.37	22.32	5.62	24.22	6.36	24.58	6.39	24.95	6.42	25.39	6.49	25.48	6.55
	44.0	18.72	4.42	22.32	5.68	23.97	6.42	24.33	6.45	24.69	6.48	25.16	6.51	25.23	6.79
	46.0	18.72	4.54	22.32	5.74	23.74	6.48	24.07	6.55	24.50	6.54	24.88	6.84	25.01	6.86
100%	10.0	17.01	2.03	20.25	2.45	23.58	2.91	25.20	3.14	26.82	3.38	30.15	3.86	31.86	4.00
	12.0	17.01	2.06	20.25	2.50	23.58	2.96	25.20	3.20	26.82	3.44	30.15	3.93	31.41	3.97
	14.0	17.01	2.10	20.25	2.55	23.58	3.02	25.20	3.26	26.82	3.51	30.15	4.01	31.05	3.95
	16.0	17.01	2.14	20.25	2.60	23.58	3.08	25.20	3.32	26.82	3.58	29.97	4.06	30.60	4.02
	18.0	17.01	2.18	20.25	2.64	23.58	3.13	25.20	3.39	26.82	3.65	29.61	4.20	30.24	4.23
	20.0	17.01	2.22	20.25	2.70	23.58	3.23	25.20	3.56	26.82	3.91	29.16	4.39	29.79	4.43
	21.0	17.01	2.24	20.25	2.72	23.58	3.35	25.20	3.69	26.82	4.05	28.98	4.50	29.61	4.54
	23.0	17.01	2.30	20.25	2.91	23.58	3.59	25.20	3.95	26.82	4.34	28.62	4.70	29.16	4.74
	25.0	17.01	2.45	20.25	3.10	23.58	3.84	25.20	4.24	26.82	4.65	28.17	4.91	28.80	4.95
	27.0	17.01	2.61	20.25	3.31	23.58	4.10	25.20	4.53	26.82	4.97	27.72	5.11	28.35	5.16
	29.0	17.01	2.78	20.25	3.53	23.58	4.38	25.20	4.84	26.73	5.28	27.36	5.33	27.99	5.37
	31.0	17.01	2.96	20.25	3.77	23.58	4.67	25.20	5.16	26.37	5.49	26.91	5.53	27.54	5.58
	33.0	17.01	3.14	20.25	4.01	23.58	4.98	25.20	5.51	25.92	5.69	26.55	5.74	27.18	5.79
	35.0	17.01	3.34	20.25	4.27	23.58	5.31	25.20	5.87	25.47	5.90	26.10	5.95	26.73	6.00
	37.0	17.01	3.55	20.25	4.54	23.58	5.66	24.75	6.08	25.11	6.11	25.74	6.17	26.28	6.21
	39.0	17.01	3.78	20.25	4.83	23.58	6.02	24.39	6.29	24.66	6.32	25.29	6.37	25.92	6.44
	42.0	17.01	4.01	20.25	5.06	23.58	6.32	23.88	6.34	24.41	6.45	24.71	6.52	25.42	6.61
	44.0	17.01	4.25	20.25	5.30	23.58	6.40	23.38	6.46	24.18	6.51	25.29	6.61	24.77	6.67
	46.0	17.01	4.48	20.25	5.53	23.58	6.54	22.88	6.52	24.15	6.68	24.28	6.73	24.41	6.79

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
90%	10.0	15.30	1.81	18.27	2.18	21.24	2.58	22.68	2.79	24.12	2.99	27.09	3.42	30.06	3.85
	12.0	15.30	1.84	18.27	2.22	21.24	2.63	22.68	2.83	24.12	3.05	27.09	3.48	30.06	3.93
	14.0	15.30	1.88	18.27	2.26	21.24	2.68	22.68	2.89	24.12	3.10	27.09	3.55	30.06	4.00
	16.0	15.30	1.91	18.27	2.30	21.24	2.73	22.68	2.94	24.12	3.17	27.09	3.62	29.97	4.07
	18.0	15.30	1.94	18.27	2.35	21.24	2.78	22.68	3.00	24.12	3.23	27.09	3.69	29.61	4.20
	20.0	15.30	1.98	18.27	2.40	21.24	2.83	22.68	3.06	24.12	3.35	27.09	3.97	29.16	4.39
	21.0	15.30	1.99	18.27	2.42	21.24	2.88	22.68	3.17	24.12	3.47	27.09	4.11	28.98	4.50
	23.0	15.30	2.03	18.27	2.52	21.24	3.09	22.68	3.40	24.12	3.72	27.09	4.41	28.53	4.70
	25.0	15.30	2.15	18.27	2.69	21.24	3.30	22.68	3.63	24.12	3.97	27.09	4.72	28.17	4.91
	27.0	15.30	2.28	18.27	2.87	21.24	3.52	22.68	3.88	24.12	4.25	27.09	5.05	27.72	5.11
	29.0	15.30	2.43	18.27	3.06	21.24	3.76	22.68	4.14	24.12	4.54	26.82	5.28	27.36	5.32
	31.0	15.30	2.58	18.27	3.25	21.24	4.01	22.68	4.42	24.12	4.84	26.37	5.49	26.91	5.53
	33.0	15.30	2.74	18.27	3.46	21.24	4.27	22.68	4.71	24.12	5.17	26.01	5.70	26.55	5.74
	35.0	15.30	2.91	18.27	3.68	21.24	4.55	22.68	5.02	24.12	5.51	25.56	5.91	26.10	5.95
	37.0	15.30	3.09	18.27	3.91	21.24	4.84	22.68	5.34	24.12	5.87	25.11	6.11	25.74	6.16
	39.0	15.30	3.28	18.27	4.16	21.24	5.15	22.68	5.69	24.12	6.25	24.75	6.33	25.29	6.37
	42.0	15.30	3.43	18.27	4.41	21.24	5.40	22.68	5.89	24.12	6.30	24.52	6.54	25.06	6.57
	44.0	15.30	3.68	18.27	4.67	21.24	5.66	22.68	6.09	24.12	6.55	24.38	6.60	24.74	6.67
	46.0	15.30	3.88	18.27	4.87	21.24	5.86	22.68	6.29	24.12	6.66	24.25	6.68	24.30	6.75
80%	10.0	13.59	1.61	16.20	1.92	18.81	2.26	20.16	2.44	21.51	2.61	24.12	2.98	26.73	3.36
	12.0	13.59	1.63	16.20	1.96	18.81	2.30	20.16	2.49	21.51	2.67	24.12	3.04	26.73	3.43
	14.0	13.59	1.66	16.20	1.99	18.81	2.34	20.16	2.53	21.51	2.72	24.12	3.10	26.73	3.49
	16.0	13.59	1.69	16.20	2.03	18.81	2.39	20.16	2.57	21.51	2.76	24.12	3.16	26.73	3.55
	18.0	13.59	1.72	16.20	2.07	18.81	2.44	20.16	2.63	21.51	2.82	24.12	3.22	26.73	3.63
	20.0	13.59	1.75	16.20	2.11	18.81	2.49	20.16	2.68	21.51	2.87	24.12	3.34	26.73	3.88
	21.0	13.59	1.77	16.20	2.12	18.81	2.51	20.16	2.71	21.51	2.94	24.12	3.46	26.73	4.02
	23.0	13.59	1.80	16.20	2.17	18.81	2.63	20.16	2.88	21.51	3.14	24.12	3.70	26.73	4.31
	25.0	13.59	1.85	16.20	2.30	18.81	2.81	20.16	3.08	21.51	3.36	24.12	3.97	26.73	4.62
	27.0	13.59	1.97	16.20	2.45	18.81	2.99	20.16	3.29	21.51	3.59	24.12	4.24	26.73	4.94
	29.0	13.59	2.10	16.20	2.61	18.81	3.19	20.16	3.50	21.51	3.83	24.12	4.52	26.73	5.28
	31.0	13.59	2.22	16.20	2.78	18.81	3.40	20.16	3.73	21.51	4.09	24.12	4.83	26.28	5.49
	33.0	13.59	2.37	16.20	2.95	18.81	3.62	20.16	3.97	21.51	4.35	24.12	5.15	25.92	5.69
	35.0	13.59	2.51	16.20	3.14	18.81	3.85	20.16	4.23	21.51	4.63	24.12	5.49	25.47	5.90
	37.0	13.59	2.66	16.20	3.33	18.81	4.09	20.16	4.50	21.51	4.93	24.12	5.85	25.11	6.10
	39.0	13.59	2.82	16.20	3.55	18.81	4.35	20.16	4.79	21.51	5.25	24.12	6.23	24.66	6.32
	42.0	13.59	2.90	16.20	3.60	18.81	4.44	20.16	4.96	21.51	5.38	24.12	6.44	24.46	6.47
	44.0	13.59	3.03	16.20	3.64	18.81	4.52	20.16	5.04	21.51	5.46	24.12	6.48	24.26	6.53
	46.0	13.59	3.07	16.20	3.68	18.81	4.61	20.16	5.17	21.51	5.56	24.12	6.58	24.05	6.68

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
70%	10.0	11.88	1.42	14.22	1.68	16.47	1.96	17.64	2.11	18.81	2.26	21.06	2.56	23.40	2.88
	12.0	11.88	1.43	14.22	1.70	16.47	2.00	17.64	2.15	18.81	2.30	21.06	2.61	23.40	2.94
	14.0	11.88	1.46	14.22	1.73	16.47	2.03	17.64	2.18	18.81	2.34	21.06	2.66	23.40	2.99
	16.0	11.88	1.48	14.22	1.77	16.47	2.07	17.64	2.22	18.81	2.38	21.06	2.71	23.40	3.05
	18.0	11.88	1.50	14.22	1.80	16.47	2.11	17.64	2.26	18.81	2.42	21.06	2.76	23.40	3.11
	20.0	11.88	1.53	14.22	1.83	16.47	2.15	17.64	2.30	18.81	2.47	21.06	2.82	23.40	3.20
	21.0	11.88	1.54	14.22	1.84	16.47	2.16	17.64	2.33	18.81	2.49	21.06	2.86	23.40	3.31
	23.0	11.88	1.57	14.22	1.88	16.47	2.21	17.64	2.41	18.81	2.62	21.06	3.06	23.40	3.55
	25.0	11.88	1.60	14.22	1.96	16.47	2.35	17.64	2.57	18.81	2.79	21.06	3.28	23.40	3.79
	27.0	11.88	1.69	14.22	2.08	16.47	2.51	17.64	2.74	18.81	2.98	21.06	3.50	23.40	4.05
	29.0	11.88	1.80	14.22	2.21	16.47	2.67	17.64	2.92	18.81	3.17	21.06	3.73	23.40	4.33
	31.0	11.88	1.90	14.22	2.34	16.47	2.84	17.64	3.10	18.81	3.38	21.06	3.97	23.40	4.62
	33.0	11.88	2.02	14.22	2.49	16.47	3.02	17.64	3.30	18.81	3.60	21.06	4.24	23.40	4.92
	35.0	11.88	2.14	14.22	2.64	16.47	3.21	17.64	3.52	18.81	3.83	21.06	4.51	23.40	5.25
	37.0	11.88	2.26	14.22	2.80	16.47	3.41	17.64	3.73	18.81	4.08	21.06	4.81	23.40	5.59
	39.0	11.88	2.39	14.22	2.97	16.47	3.62	17.64	3.97	18.81	4.33	21.06	5.11	23.40	5.95
	42.0	11.88	2.53	14.22	3.11	16.47	3.76	17.64	4.14	18.81	4.51	21.06	5.39	23.40	6.30
	44.0	11.88	2.70	14.22	3.29	16.47	3.88	17.64	4.32	18.81	4.68	21.06	5.63	23.40	6.52
	46.0	11.88	2.82	14.22	3.43	16.47	4.04	17.64	4.46	18.81	4.82	21.06	5.81	23.40	6.66
60%	10.0	10.17	1.23	12.15	1.44	14.13	1.67	15.20	1.79	16.11	1.91	18.09	2.16	20.07	2.42
	12.0	10.17	1.25	12.15	1.46	14.13	1.70	15.20	1.82	16.11	1.94	18.09	2.20	20.07	2.46
	14.0	10.17	1.27	12.15	1.49	14.13	1.73	15.20	1.85	16.11	1.98	18.09	2.24	20.07	2.51
	16.0	10.17	1.28	12.15	1.51	14.13	1.76	15.20	1.88	16.11	2.01	18.09	2.28	20.07	2.56
	18.0	10.17	1.31	12.15	1.54	14.13	1.79	15.20	1.92	16.11	2.05	18.09	2.32	20.07	2.60
	20.0	10.17	1.32	12.15	1.57	14.13	1.82	15.20	1.96	16.11	2.09	18.09	2.37	20.07	2.66
	21.0	10.17	1.34	12.15	1.58	14.13	1.84	15.20	1.97	16.11	2.11	18.09	2.39	20.07	2.68
	23.0	10.17	1.35	12.15	1.61	14.13	1.87	15.20	2.01	16.11	2.14	18.09	2.49	20.07	2.86
	25.0	10.17	1.38	12.15	1.63	14.13	1.94	15.20	2.11	16.11	2.28	18.09	2.65	20.07	3.05
	27.0	10.17	1.43	12.15	1.73	14.13	2.07	15.20	2.25	16.11	2.43	18.09	2.83	20.07	3.25
	29.0	10.17	1.51	12.15	1.84	14.13	2.20	15.20	2.39	16.11	2.59	18.09	3.02	20.07	3.47
	31.0	10.17	1.61	12.15	1.95	14.13	2.33	15.20	2.54	16.11	2.75	18.09	3.21	20.07	3.70
	33.0	10.17	1.69	12.15	2.07	14.13	2.48	15.20	2.70	16.11	2.93	18.09	3.41	20.07	3.94
	35.0	10.17	1.80	12.15	2.19	14.13	2.63	15.20	2.87	16.11	3.11	18.09	3.63	20.07	4.20
	37.0	10.17	1.90	12.15	2.32	14.13	2.79	15.20	3.04	16.11	3.30	18.09	3.86	20.07	4.46
	39.0	10.17	2.00	12.15	2.45	14.13	2.95	15.20	3.22	16.11	3.51	18.09	4.10	20.07	4.75
	42.0	10.17	2.09	12.15	2.59	14.13	3.10	15.20	3.39	16.11	3.68	18.09	4.36	20.07	5.04
	44.0	10.17	2.17	12.15	2.74	14.13	3.24	15.20	3.51	16.11	3.85	18.09	4.59	20.07	5.32
	46.0	10.17	2.29	12.15	2.87	14.13	3.35	15.20	3.65	16.11	4.05	18.09	4.76	20.07	5.61

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
50%	10.0	8.51	1.06	10.17	1.23	11.79	1.40	12.60	1.50	13.41	1.58	15.03	1.78	16.74	1.99
	12.0	8.51	1.07	10.17	1.24	11.79	1.42	12.60	1.51	13.41	1.61	15.03	1.81	16.74	2.02
	14.0	8.51	1.08	10.17	1.26	11.79	1.44	12.60	1.54	13.41	1.64	15.03	1.84	16.74	2.06
	16.0	8.51	1.10	10.17	1.27	11.79	1.46	12.60	1.57	13.41	1.66	15.03	1.88	16.74	2.09
	18.0	8.51	1.12	10.17	1.30	11.79	1.49	12.60	1.59	13.41	1.69	15.03	1.91	16.74	2.13
	20.0	8.51	1.13	10.17	1.31	11.79	1.51	12.60	1.61	13.41	1.73	15.03	1.94	16.74	2.17
	21.0	8.51	1.14	10.17	1.33	11.79	1.53	12.60	1.63	13.41	1.74	15.03	1.96	16.74	2.19
	23.0	8.51	1.16	10.17	1.35	11.79	1.55	12.60	1.66	13.41	1.77	15.03	1.99	16.74	2.24
	25.0	8.51	1.17	10.17	1.37	11.79	1.58	12.60	1.69	13.41	1.83	15.03	2.10	16.74	2.39
	27.0	8.51	1.20	10.17	1.42	11.79	1.67	12.60	1.80	13.41	1.94	15.03	2.23	16.74	2.55
	29.0	8.51	1.26	10.17	1.50	11.79	1.77	12.60	1.92	13.41	2.07	15.03	2.37	16.74	2.72
	31.0	8.51	1.33	10.17	1.59	11.79	1.88	12.60	2.03	13.41	2.19	15.03	2.52	16.74	2.89
	33.0	8.51	1.41	10.17	1.69	11.79	1.99	12.60	2.15	13.41	2.33	15.03	2.68	16.74	3.07
	35.0	8.51	1.49	10.17	1.78	11.79	2.11	12.60	2.28	13.41	2.46	15.03	2.85	16.74	3.26
	37.0	8.51	1.57	10.17	1.88	11.79	2.23	12.60	2.41	13.41	2.61	15.03	3.02	16.74	3.47
	39.0	8.51	1.65	10.17	1.99	11.79	2.36	12.60	2.56	13.41	2.77	15.03	3.21	16.74	3.68
	42.0	8.51	1.75	10.17	2.10	11.79	2.47	12.60	2.72	13.41	2.93	15.03	3.43	16.74	3.91
	44.0	8.51	1.84	10.17	2.21	11.79	2.59	12.60	2.88	13.41	3.00	15.03	3.66	16.74	4.14
	46.0	8.51	1.92	10.17	2.33	11.79	2.70	12.60	3.01	13.41	3.09	15.03	3.89	16.74	4.36

Note:

- *is shown as reference.*
- *In cooling mode, avoid the outdoor air temperature range from 42-46°C, when selecting the models.*
- *The above talbe shows the average value of conditions may operate.*
- *It is recommended to use capacity index less than 130%.*

Heating Mode: 4TVH0086

Table 9

TC: Total Capacity (kW) **WB:** Wet-bulb Temperature **DB:** Dry-bulb Temperature **PI:** Power Input (kW)

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
130%	-19.8	-20.0	17.48	4.34	17.40	4.65	17.32	4.96	17.32	5.11	17.23	5.26	17.23	5.57
	-18.8	-19.0	17.74	4.44	17.66	4.74	17.66	5.05	17.57	5.20	17.57	5.34	17.48	5.65
	-16.7	-17.0	18.43	4.65	18.34	4.94	18.26	5.23	18.26	5.37	18.26	5.52	18.17	5.81
	-14.7	-15.0	19.20	4.86	19.12	5.14	19.03	5.42	19.03	5.56	18.94	5.70	18.94	5.98
	-12.6	-13.0	19.97	5.08	19.97	5.35	19.89	5.61	19.80	5.75	19.80	5.89	19.71	6.15
	-10.5	-11.0	20.92	5.30	20.83	5.56	20.74	5.81	20.74	5.94	20.74	6.07	20.66	6.33
	-9.5	-10.0	21.43	5.42	21.34	5.66	21.26	5.91	21.26	6.04	21.17	6.16	21.17	6.41
	-8.5	-9.1	21.86	5.51	21.77	5.75	21.77	6.00	21.69	6.12	21.69	6.24	21.60	6.49
	-7.0	-7.6	22.63	5.67	22.63	5.91	22.54	6.14	22.54	6.26	22.46	6.37	22.37	6.61
	-5.0	-5.6	23.83	5.89	23.74	6.11	23.66	6.33	23.66	6.45	23.57	6.55	23.57	6.77
	-3.0	-3.7	24.94	6.08	24.86	6.29	24.86	6.50	24.77	6.61	24.77	6.72	24.68	6.92
	0.0	-0.7	26.91	6.37	26.91	6.57	26.83	6.76	26.83	6.84	26.74	6.96	26.74	7.16
	3.0	2.2	29.05	6.64	28.97	6.82	28.89	7.00	28.89	7.09	28.89	7.19	28.80	7.36
	5.0	4.1	30.51	6.80	30.43	6.98	30.43	7.15	30.34	7.24	30.34	7.32	30.26	7.49
	7.0	6.0	32.06	6.97	31.97	7.12	31.97	7.29	31.88	7.37	31.88	7.45	30.60	7.16
	9.0	7.9	33.68	7.11	33.60	7.27	33.60	7.42	33.51	7.50	32.83	7.34	30.60	6.72
	11.0	9.8	35.40	7.25	35.31	7.40	35.14	7.49	33.94	7.20	32.83	6.90	30.60	6.33
	13.0	11.8	37.28	7.39	37.20	7.53	35.14	7.02	33.94	6.73	32.83	6.48	30.60	5.94
	15.0	13.7	39.08	7.52	37.37	7.13	35.14	6.61	33.94	6.36	32.83	6.10	30.60	5.61
120%	-19.8	-20.0	17.40	4.76	17.31	5.04	17.23	5.33	17.23	5.46	17.23	5.61	17.14	5.89
	-18.8	-19.0	17.66	4.85	17.57	5.13	17.57	5.41	17.49	5.54	17.49	5.69	17.40	5.97
	-16.7	-17.0	18.34	5.04	18.26	5.31	18.14	5.57	18.17	5.71	18.17	5.85	18.09	6.11
	-14.7	-15.0	19.12	5.24	19.03	5.50	18.94	5.75	18.94	5.89	18.94	6.01	18.86	6.27
	-12.6	-13.0	19.89	5.44	19.89	5.69	19.80	5.93	19.80	6.06	19.72	6.18	19.72	6.43
	-10.5	-11.0	20.83	5.65	20.74	5.88	20.74	6.12	20.66	6.24	20.66	6.35	20.57	6.59
	-9.5	-10.0	21.35	5.75	21.26	5.98	21.17	6.21	21.17	6.33	21.17	6.44	21.09	6.67
	-8.5	-9.1	21.77	5.84	21.69	6.06	21.69	6.29	21.60	6.40	21.60	6.52	21.51	6.74
	-7.0	-7.6	22.54	5.99	22.54	6.21	22.46	6.42	22.46	6.53	22.37	6.64	22.37	6.85
	-5.0	-5.6	23.74	6.18	23.66	6.39	23.57	6.60	23.57	6.70	23.57	6.81	23.49	7.00
	-3.0	-3.7	24.86	6.37	24.86	6.57	24.77	6.76	24.77	6.85	24.69	6.96	24.69	7.15
	0.0	-0.7	26.83	6.64	26.83	6.82	26.74	7.00	26.74	7.09	26.66	7.18	26.66	7.36
	3.0	2.2	28.97	6.89	28.89	7.05	28.89	7.22	28.80	7.31	28.80	7.39	28.20	7.35
	5.0	4.1	30.43	7.04	30.34	7.20	30.34	7.36	30.26	7.44	30.26	7.52	28.20	6.90
	7.0	6.0	31.97	7.18	31.97	7.33	31.89	7.48	31.37	7.38	30.34	7.08	28.20	6.49
	9.0	7.9	33.60	7.32	33.52	7.47	32.40	7.22	31.37	6.93	30.34	6.65	28.20	6.11
	11.0	9.8	35.31	7.45	34.46	7.32	32.40	6.79	31.37	6.53	30.34	6.26	28.20	5.76
	13.0	11.8	33.60	7.38	34.46	6.87	32.40	6.37	31.37	6.13	30.34	5.89	28.20	5.42
	15.0	13.7	33.60	6.95	34.46	6.47	32.40	6.01	31.37	5.77	30.34	5.55	28.20	5.11

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
110%	-19.8	-20.0	17.31	5.18	17.23	5.43	17.14	5.69	17.14	5.82	17.15	5.95	17.06	6.21
	-18.8	-19.0	17.57	5.26	17.49	5.51	17.49	5.77	17.49	5.89	17.40	6.02	17.40	6.28
	-16.7	-17.0	18.26	5.43	18.17	5.68	18.43	5.93	18.09	6.05	18.09	6.17	18.00	6.41
	-14.7	-15.0	19.03	5.62	18.95	5.85	18.86	6.09	18.86	6.21	18.86	6.33	18.77	6.56
	-12.6	-13.0	19.80	5.81	19.80	6.03	19.71	6.25	19.71	6.37	19.63	6.48	19.63	6.71
	-10.5	-11.0	20.74	5.99	20.66	6.21	20.66	6.42	20.57	6.53	20.57	6.64	20.57	6.85
	-9.5	-10.0	21.26	6.09	21.17	6.29	21.08	6.51	21.08	6.61	21.08	6.72	21.00	6.93
	-8.5	-9.1	21.69	6.17	21.60	6.37	21.60	6.58	21.51	6.69	21.51	6.79	21.51	6.19
	-7.0	-7.6	22.46	6.31	22.46	6.50	22.37	6.70	22.37	6.80	22.37	6.90	22.29	7.10
	-5.0	-5.6	23.66	6.49	23.57	6.68	23.49	6.86	23.49	6.96	23.49	7.05	23.40	7.25
	-3.0	-3.7	24.77	6.65	24.77	6.83	24.69	7.01	24.69	7.10	24.60	7.19	24.60	7.37
	0.0	-0.7	26.74	6.90	26.74	7.07	26.66	7.24	26.66	7.32	26.66	7.40	25.89	7.26
	3.0	2.2	28.89	7.13	28.80	7.28	28.80	7.44	28.71	7.51	27.77	7.20	25.89	6.61
	5.0	4.1	30.34	7.27	30.34	7.42	29.74	7.35	28.71	7.05	27.77	6.77	25.89	6.21
	7.0	6.0	31.88	7.40	31.63	7.45	29.74	6.90	28.71	6.63	27.77	6.37	25.89	5.85
	9.0	7.9	33.51	7.52	31.63	7.00	29.74	6.49	28.71	6.24	27.77	5.99	25.89	5.51
	11.0	9.8	33.51	7.08	31.63	6.59	29.74	6.11	28.71	5.88	27.77	5.65	25.89	5.20
	13.0	11.8	33.51	6.64	31.63	6.18	29.74	5.74	28.71	5.53	27.77	5.31	25.89	4.90
	15.0	13.7	33.51	5.89	31.63	5.83	29.74	5.42	28.71	5.22	27.77	5.02	25.89	4.63
100%	-19.8	-20.0	17.23	5.59	17.14	5.82	17.14	6.06	17.06	6.18	17.06	6.29	16.97	6.53
	-18.8	-19.0	17.49	5.66	17.49	5.89	17.40	6.13	17.40	6.25	17.32	6.37	17.32	6.60
	-16.7	-17.0	18.17	5.82	18.08	6.05	18.08	6.27	18.00	6.38	18.00	6.49	18.00	6.72
	-14.7	-15.0	18.94	5.99	18.86	6.21	18.77	6.42	18.77	6.53	18.77	6.64	18.69	6.85
	-12.6	-13.0	19.72	6.17	19.72	6.37	19.63	6.57	19.63	6.68	19.63	6.78	19.54	6.99
	-10.5	-11.0	20.66	6.33	20.57	6.53	20.57	6.73	20.57	6.83	20.48	6.92	20.48	7.12
	-9.5	-10.0	21.17	6.42	21.09	6.61	21.09	6.80	21.00	6.90	21.00	7.00	20.91	7.19
	-8.5	-9.1	21.60	6.49	21.51	6.69	21.51	6.87	21.51	6.96	21.43	7.06	21.43	7.24
	-7.0	-7.6	22.37	6.62	22.37	6.80	22.29	6.98	22.29	7.08	22.29	7.16	22.20	7.35
	-5.0	-5.6	23.57	6.79	23.48	6.96	23.48	7.13	23.40	7.21	23.40	7.30	23.31	7.48
	-3.0	-3.7	24.69	6.94	24.69	6.30	24.60	7.27	24.60	7.35	24.60	7.43	23.57	7.12
	0.0	-0.7	26.66	7.16	26.66	7.32	26.57	7.47	26.14	7.35	25.29	7.04	23.57	6.46
	3.0	2.2	28.80	7.37	28.71	7.51	27.00	6.95	26.14	6.68	25.29	6.41	23.57	5.89
	5.0	4.1	30.26	7.51	28.71	7.05	27.00	6.53	26.14	6.29	25.29	6.04	23.57	5.55
	7.0	6.0	30.43	7.12	28.71	6.63	27.00	6.15	26.14	5.92	25.29	5.69	23.57	5.23
	9.0	7.9	30.43	6.69	28.71	6.24	27.00	5.79	26.14	5.50	25.29	5.36	23.57	4.94
	11.0	9.8	30.43	6.30	28.71	5.88	27.00	5.46	26.14	5.26	25.29	5.06	23.57	4.66
	13.0	11.8	30.43	5.92	28.71	5.53	27.00	5.14	26.14	4.95	25.29	4.77	23.57	4.40
	15.0	13.7	30.43	5.58	28.71	5.22	27.00	4.86	26.14	4.68	25.29	4.50	23.57	4.17

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
90%	-19.8	-20.0	17.11	6.01	17.03	6.21	17.03	6.43	16.94	6.53	16.94	6.64	16.94	6.85
	-18.8	-19.0	17.37	6.07	17.37	6.29	17.28	6.49	17.28	6.60	17.28	6.70	17.20	6.91
	-16.7	-17.0	18.05	6.22	17.97	6.42	17.97	6.62	17.97	6.72	17.88	6.82	17.88	7.02
	-14.7	-15.0	18.82	6.37	18.74	6.57	18.74	6.76	18.65	6.85	18.65	6.95	18.65	7.14
	-12.6	-13.0	19.59	6.53	19.59	6.71	19.51	6.89	19.51	6.99	19.51	7.08	19.42	7.26
	-10.5	-11.0	20.54	6.68	20.54	6.85	20.45	7.03	20.45	7.12	20.45	7.21	20.36	7.39
	-9.5	-10.0	21.05	6.76	20.96	6.93	20.96	7.10	20.88	7.19	20.88	7.28	20.88	7.44
	-8.5	-9.1	21.48	6.83	21.48	7.00	21.39	7.16	21.39	7.24	21.39	7.33	21.13	7.40
	-7.0	-7.6	22.25	6.94	22.25	7.10	22.16	7.27	22.16	7.35	22.16	7.43	21.13	7.07
	-5.0	-5.6	23.44	7.09	23.36	7.24	23.36	7.40	23.27	7.48	22.67	7.24	21.13	6.64
	-3.0	-3.7	24.56	7.23	24.56	7.37	24.30	7.40	23.44	7.11	22.67	6.82	21.13	6.26
	0.0	-0.7	26.61	7.44	25.84	7.25	24.30	6.72	23.44	6.45	22.67	6.20	21.13	5.69
	3.0	2.2	27.38	7.08	25.84	6.60	24.30	6.12	23.44	5.89	22.67	5.65	21.13	5.21
	5.0	4.1	27.38	6.66	25.84	6.21	24.30	5.77	23.44	5.54	22.67	5.34	21.13	4.91
	7.0	6.0	27.38	6.26	25.84	5.85	24.30	5.43	23.44	5.23	22.67	5.03	21.13	4.64
	9.0	7.9	27.38	5.90	25.84	5.50	24.30	5.12	23.44	4.94	22.67	4.75	21.13	4.39
	11.0	9.8	27.38	5.56	25.84	5.19	24.30	4.84	23.44	4.66	22.67	4.49	21.13	4.15
	13.0	11.8	27.38	5.23	25.84	4.90	24.30	4.56	23.44	4.40	22.67	4.24	21.13	3.92
	15.0	13.7	27.38	4.94	25.84	4.62	24.30	4.32	23.44	4.17	22.67	4.02	21.13	3.72
80%	-19.8	-20.0	17.06	6.42	16.97	6.61	16.97	6.80	16.97	6.89	16.88	6.99	16.88	7.17
	-18.8	-19.0	17.31	6.48	17.31	6.67	17.23	6.85	17.23	6.95	17.23	7.04	17.14	7.23
	-16.7	-17.0	18.00	6.61	17.92	6.79	17.92	6.97	17.92	7.06	17.92	7.15	17.83	7.32
	-14.7	-15.0	18.77	6.75	18.69	6.92	18.69	7.09	18.69	7.17	18.60	7.26	18.60	7.44
	-12.6	-13.0	19.54	6.88	19.54	7.05	19.46	7.21	19.46	7.29	19.46	7.38	18.86	7.18
	-10.5	-11.0	20.49	7.02	20.49	7.18	20.40	7.34	20.40	7.41	20.23	7.40	18.86	6.78
	-9.5	-10.0	21.00	7.09	20.91	7.24	20.92	7.40	20.92	7.48	20.23	7.18	18.86	6.58
	-8.5	-9.1	21.43	7.16	19.92	7.31	21.34	7.45	20.92	7.28	20.23	6.99	18.86	6.41
	-7.0	-7.6	22.20	7.26	22.20	7.40	21.60	7.24	20.92	6.96	20.23	6.68	18.86	6.13
	-5.0	-5.6	23.40	7.39	22.97	7.35	21.60	6.80	20.92	6.54	20.23	6.28	18.86	5.77
	-3.0	-3.7	24.34	7.43	22.97	6.92	21.60	6.41	20.92	6.17	20.23	5.92	18.86	5.45
	0.0	-0.7	24.34	6.74	22.97	6.28	21.60	5.83	20.92	5.61	20.23	5.39	18.86	4.97
	3.0	2.2	24.34	6.14	22.97	5.73	21.60	5.33	20.92	5.13	20.23	4.94	18.86	4.55
	5.0	4.1	24.34	5.78	22.97	5.40	21.60	5.02	20.92	4.84	20.23	4.66	18.86	4.30
	7.0	6.0	24.34	5.45	22.97	5.10	21.60	4.74	20.92	4.58	20.23	4.41	18.86	4.07
	9.0	7.9	24.34	5.14	22.97	4.81	21.60	4.48	20.92	4.32	20.23	4.17	18.86	3.86
	11.0	9.8	24.34	4.86	22.97	4.54	21.60	4.24	20.92	4.09	20.23	3.95	18.86	3.66
	13.0	11.8	24.34	4.58	22.97	4.29	21.60	4.01	20.92	3.87	20.23	3.73	18.86	3.46
	15.0	13.7	24.34	4.33	22.97	4.07	21.60	3.80	20.92	3.67	20.23	3.54	18.86	3.29

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
70%	-19.8	-20.0	16.93	6.84	16.85	7.00	16.85	7.16	16.85	7.24	16.85	7.33	16.42	7.25
	-18.8	-19.0	17.19	6.89	17.19	7.05	17.10	7.21	17.10	7.29	17.10	7.38	16.42	7.10
	-16.7	-17.0	17.87	7.00	17.87	7.16	17.79	7.32	17.79	7.40	17.62	6.59	16.42	6.77
	-14.7	-15.0	18.64	7.12	18.56	7.28	18.56	7.43	18.22	7.32	17.62	7.02	16.42	6.44
	-12.6	-13.0	19.41	7.24	19.41	7.39	18.90	7.21	18.22	6.93	17.62	6.65	16.42	6.10
	-10.5	-11.0	20.35	7.36	20.10	7.36	18.90	6.81	18.22	6.55	17.62	6.29	16.42	5.77
	-9.5	-10.0	20.87	7.43	20.10	7.14	18.90	6.61	18.22	6.36	17.62	6.11	16.42	5.61
	-8.5	-9.1	21.29	7.47	20.10	6.95	18.90	6.44	18.22	6.19	17.62	5.95	16.42	5.47
	-7.0	-7.6	21.29	7.13	20.10	6.64	18.90	6.16	18.22	5.93	17.62	5.69	16.42	5.24
	-5.0	-5.6	21.29	6.70	20.10	6.25	18.90	5.80	18.22	5.57	17.62	6.59	16.42	4.94
	-3.0	-3.7	21.29	6.31	20.10	5.89	18.90	5.47	18.22	5.26	17.62	5.06	16.42	4.67
	0.0	-0.7	21.29	5.74	20.10	5.37	18.90	4.99	18.22	4.81	17.62	4.63	16.42	4.28
	3.0	2.2	21.29	5.25	20.10	4.91	18.90	4.58	18.22	4.41	17.62	4.25	16.42	3.93
	5.0	4.1	21.29	4.95	20.10	4.63	18.90	4.33	18.22	4.17	17.62	4.02	16.42	3.72
	7.0	6.0	21.29	4.68	20.10	4.38	18.90	4.09	18.22	3.95	17.62	3.81	16.42	3.53
	9.0	7.9	21.29	4.42	20.10	4.15	18.90	3.87	18.22	3.74	17.62	3.61	16.42	3.35
	11.0	9.8	21.29	4.18	20.10	3.92	18.90	3.67	18.22	3.55	17.62	3.43	16.42	3.18
	13.0	11.8	21.29	3.95	20.10	3.71	18.90	3.47	18.22	3.36	17.62	3.24	16.42	3.02
	15.0	13.7	21.29	3.75	20.10	3.52	18.90	3.30	18.22	3.19	17.62	3.08	16.42	2.88
60%	-19.8	-20.0	16.89	7.25	16.80	7.39	16.20	7.11	15.69	6.83	15.17	6.56	14.14	6.01
	-18.8	-19.0	17.14	7.30	17.14	7.44	16.20	6.96	15.69	6.68	15.17	6.41	14.14	5.89
	-16.7	-17.0	17.83	7.40	17.23	7.16	16.20	6.64	15.69	6.38	15.17	6.13	14.14	5.63
	-14.7	-15.0	18.26	7.32	17.23	6.80	16.20	6.31	15.69	6.07	15.17	5.83	14.14	5.36
	-12.6	-13.0	18.26	6.92	17.23	6.44	16.20	5.98	15.69	5.76	15.17	5.53	14.14	5.12
	-10.5	-11.0	18.26	6.54	17.23	6.09	16.20	5.66	15.69	5.45	15.17	5.24	14.14	4.83
	-9.5	-10.0	18.26	6.36	17.23	5.93	16.20	5.50	15.69	5.30	15.17	5.10	14.14	4.70
	-8.5	-9.1	18.26	6.19	17.23	5.77	16.20	5.37	15.69	5.17	15.17	4.97	14.14	4.58
	-7.0	-7.6	18.26	5.92	17.23	5.53	16.20	5.14	15.69	4.95	15.17	4.76	14.14	4.40
	-5.0	-5.6	18.26	5.57	17.23	5.21	16.20	4.85	15.69	4.67	15.17	4.50	14.14	4.16
	-3.0	-3.7	18.26	5.26	17.23	4.92	16.20	4.58	15.69	4.42	15.17	4.26	14.14	3.94
	0.0	-0.7	18.26	4.81	17.23	4.50	16.20	4.20	15.69	4.06	15.17	3.91	14.14	3.62
	3.0	2.2	18.26	4.41	17.23	4.14	16.20	3.87	15.69	3.73	15.17	3.60	14.14	3.34
	5.0	4.1	18.26	4.17	17.23	3.91	16.20	3.66	15.69	3.54	15.17	3.41	14.14	3.17
	7.0	6.0	18.26	3.95	17.23	3.71	16.20	3.47	15.69	3.35	15.17	3.24	14.14	3.01
	9.0	7.9	18.26	3.74	17.23	3.51	16.20	3.29	15.69	3.19	15.17	3.07	14.14	2.87
	11.0	9.8	18.26	3.55	17.23	3.34	16.20	3.13	15.69	3.03	15.17	2.92	14.14	2.73
	13.0	11.8	18.26	3.35	17.23	3.16	16.20	2.97	15.69	2.88	15.17	2.78	14.14	2.60
	15.0	13.7	18.26	3.19	17.23	3.00	16.20	2.83	15.69	2.74	15.17	2.65	14.14	2.48

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
50%	-19.8	-20.0	15.21	6.60	14.35	6.14	13.50	5.70	12.99	5.49	12.56	5.28	11.71	4.86
	-18.8	-19.0	15.21	6.45	14.35	6.01	13.50	5.59	12.99	5.38	12.56	5.17	11.71	4.77
	-16.7	-17.0	15.21	6.16	14.35	5.74	13.50	5.34	12.99	5.14	12.56	4.95	11.71	4.57
	-14.7	-15.0	15.21	5.86	14.35	5.47	13.50	5.09	12.99	4.90	12.56	4.72	11.71	4.36
	-12.6	-13.0	15.21	5.57	14.35	5.20	13.50	4.84	12.99	4.66	12.56	4.49	11.71	4.15
	-10.5	-11.0	15.21	5.27	14.35	4.93	13.50	4.59	12.99	4.42	12.56	4.26	11.71	3.95
	-9.5	-10.0	15.21	5.13	14.35	4.79	13.50	4.47	12.99	4.31	12.56	4.15	11.71	3.84
	-8.5	-9.1	15.21	5.00	14.35	4.68	13.50	4.36	12.99	4.21	12.56	4.06	11.71	3.75
	-7.0	-7.6	15.21	4.79	14.35	4.49	13.50	4.18	12.99	4.04	12.56	3.90	11.71	3.61
	-5.0	-5.6	15.21	4.52	14.35	4.24	13.50	3.96	12.99	3.83	12.56	3.69	11.71	3.42
	-3.0	-3.7	15.21	4.28	14.35	4.02	13.50	3.75	12.99	3.63	12.56	3.50	11.71	3.25
	0.0	-0.7	15.21	3.93	14.35	3.69	13.50	3.46	12.99	3.34	12.56	3.23	11.71	3.00
	3.0	2.2	15.21	3.62	14.35	3.40	13.50	3.19	12.99	3.08	12.56	2.98	11.71	2.78
	5.0	4.1	15.21	3.43	14.35	3.23	13.50	3.03	12.99	2.93	12.56	2.84	11.71	2.64
	7.0	6.0	15.21	3.26	14.35	3.07	13.50	2.88	12.99	2.79	12.56	2.70	11.71	2.52
	9.0	7.9	15.21	3.09	14.35	2.92	13.50	2.74	12.99	2.66	12.56	2.57	11.71	2.40
	11.0	9.8	15.21	2.94	14.35	2.77	13.50	2.61	12.99	2.53	12.56	2.45	11.71	2.29
	13.0	11.8	15.21	2.80	14.35	2.64	13.50	2.48	12.99	2.41	12.56	2.33	11.71	2.19
	15.0	13.7	15.21	2.66	14.35	2.52	13.50	2.37	12.99	2.30	12.56	2.23	11.71	2.09

Note:

- *is shown as reference.*
- *In heating mode, avoid the outdoor air temperature range from -15–20 °C, when selecting the models.*
- *The above talbe shows the average value of conditions may operate.*
- *It is recommended to use capacity index less than 130%.*

Cooling Mode: 4TVH0096

Table 10

TC: Total Capacity (kW) **WB:** Wet-bulb Temperature **DB:** Dry-bulb Temperature **PI:** Power Input (kW)

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
130%	10.0	24.60	3.32	29.30	4.06	34.00	4.82	35.30	4.93	35.70	4.83	36.60	4.63	37.50	4.41
	12.0	24.60	3.38	29.30	4.13	34.00	4.92	34.80	4.90	35.30	4.80	36.10	4.59	37.00	4.52
	14.0	24.60	3.44	29.30	4.21	33.90	4.98	34.40	4.92	34.80	4.77	35.70	4.73	36.60	4.78
	16.0	24.60	3.50	29.30	4.30	33.50	4.96	33.90	4.88	34.30	4.94	35.20	4.99	36.10	5.04
	18.0	24.60	3.57	29.30	4.39	33.00	5.14	33.40	5.17	33.90	5.20	34.80	5.25	35.70	5.30
	20.0	24.60	3.65	29.30	4.67	32.50	5.39	33.00	5.42	33.40	5.45	34.30	5.50	35.20	5.56
	21.0	24.60	3.74	29.30	4.83	32.30	5.52	32.80	5.55	33.20	5.58	34.10	5.64	35.00	5.69
	23.0	24.60	4.02	29.30	5.18	31.90	5.77	32.30	5.80	32.70	5.83	33.60	5.89	34.50	5.95
	25.0	24.60	4.29	29.30	5.55	31.40	6.02	31.80	6.05	32.30	6.09	33.20	6.15	34.10	6.21
	27.0	24.60	4.58	29.30	5.94	31.00	6.28	31.40	6.32	31.80	6.34	32.70	6.41	33.60	6.48
	29.0	24.60	4.89	29.30	6.34	30.50	6.53	30.90	6.57	31.40	6.61	32.30	6.68	33.20	6.74
	31.0	24.60	5.22	29.20	6.71	30.00	6.79	30.50	6.83	30.90	6.86	31.80	6.94	32.70	7.01
	33.0	24.60	5.56	28.70	6.97	29.60	7.04	30.00	7.08	30.50	7.12	31.40	7.20	32.20	7.28
	35.0	24.60	5.93	28.20	7.22	29.10	7.31	29.60	7.34	30.00	7.38	30.90	7.47	31.80	7.55
	37.0	24.60	6.31	27.80	7.48	28.70	7.57	29.10	7.61	29.60	7.65	30.40	7.74	31.30	7.83
	39.0	24.60	6.72	27.30	7.56	28.20	7.82	28.70	7.87	29.10	7.92	30.00	8.01	30.90	8.10
	42.0	24.60	7.07	27.02	7.63	27.90	7.89	28.40	7.94	28.80	7.99	29.70	8.02	29.71	8.18
	44.0	24.60	7.43	26.74	7.71	27.61	7.94	28.11	8.02	28.21	8.01	28.62	8.05	29.01	8.21
	46.0	24.60	7.79	26.62	7.78	27.31	8.04	27.81	8.05	27.97	8.07	28.12	8.08	28.56	8.48
120%	10.0	22.70	3.03	27.00	3.70	31.40	4.39	33.60	4.75	35.20	4.96	36.00	4.76	36.80	4.58
	12.0	22.70	3.09	27.00	3.76	31.40	4.48	33.60	4.84	34.70	4.93	35.50	4.74	36.30	4.55
	14.0	22.70	3.14	27.00	3.84	31.40	4.57	33.60	4.94	34.20	4.90	35.10	4.71	35.90	4.74
	16.0	22.70	3.20	27.00	3.92	31.40	4.66	33.40	4.98	33.80	4.91	34.60	4.96	35.40	5.00
	18.0	22.70	3.26	27.00	4.00	31.40	4.81	32.90	5.14	33.30	5.16	34.10	5.21	35.00	5.26
	20.0	22.70	3.33	27.00	4.15	31.40	5.18	32.50	5.39	32.90	5.41	33.70	5.46	34.50	5.51
	21.0	22.70	3.36	27.00	4.30	31.40	5.36	32.20	5.52	32.60	5.54	33.50	5.59	34.30	5.65
	23.0	22.70	3.59	27.00	4.61	31.40	5.74	31.80	5.76	32.20	5.79	33.00	5.85	33.80	5.90
	25.0	22.70	3.83	27.00	4.93	30.90	6.00	31.30	6.01	31.70	6.04	32.60	6.10	33.40	6.16
	27.0	22.70	4.09	27.00	5.27	30.50	6.24	30.90	6.28	31.30	6.31	32.10	6.36	32.90	6.42
	29.0	22.70	4.37	27.00	5.63	30.00	6.49	30.40	6.53	30.80	6.56	31.60	6.63	32.50	6.68
	31.0	22.70	4.66	27.00	6.00	29.50	6.75	30.00	6.78	30.40	6.82	31.20	6.89	32.00	6.96
	33.0	22.70	4.96	27.00	6.40	29.10	7.00	29.50	7.04	29.90	7.07	30.70	7.15	31.50	7.22
	35.0	22.70	5.28	27.00	6.83	28.60	7.26	29.00	7.30	29.50	7.33	30.30	7.41	31.10	7.49
	37.0	22.70	5.62	27.00	7.28	28.20	7.52	28.60	7.56	29.00	7.60	29.80	7.67	30.60	7.76
	39.0	22.70	5.98	26.90	7.69	27.70	7.77	28.10	7.82	28.50	7.86	29.40	7.95	30.20	8.02
	42.0	22.70	6.20	26.61	7.76	27.41	7.85	27.81	7.89	28.21	7.93	29.11	7.98	29.04	8 .11
	44.0	22.70	6.27	26.47	7.83	27.12	7.90	27.52	7.92	27.92	7.95	28.24	8.01	28.71	8.39
	46.0	22.70	6.34	26.32	7.90	26.89	7.99	27.23	8.04	27.72	8.06	27.95	8.03	28.46	8.46

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
110%	10.0	20.80	2.75	24.80	3.35	28.80	3.98	30.80	4.30	32.80	4.63	35.30	4.91	36.10	4.74
	12.0	20.80	2.80	24.80	3.41	28.80	4.06	30.80	4.39	32.80	4.71	34.90	4.89	35.60	4.71
	14.0	20.80	2.85	24.80	3.47	28.80	4.13	30.80	4.46	32.80	4.80	34.40	4.86	35.20	4.71
	16.0	20.80	2.90	24.80	3.54	28.80	4.21	30.80	4.55	32.80	4.90	34.00	4.92	34.70	4.97
	18.0	20.80	2.96	24.80	3.61	28.80	4.30	30.80	4.68	32.80	5.13	33.50	5.17	34.30	5.22
	20.0	20.80	3.02	24.80	3.69	28.80	4.55	30.80	5.03	32.30	5.38	33.10	5.42	33.80	5.47
	21.0	20.80	3.05	24.80	3.79	28.80	4.71	30.80	5.21	32.10	5.51	32.80	5.55	33.60	5.60
	23.0	20.80	3.19	24.80	4.06	28.80	5.05	30.80	5.59	31.60	5.75	32.40	5.81	33.10	5.86
	25.0	20.80	3.41	24.80	4.35	28.80	5.40	30.80	5.99	31.20	6.00	31.90	6.06	32.70	6 .11
	27.0	20.80	3.63	24.80	4.65	28.80	5.78	30.30	6.24	30.70	6.26	31.50	6.32	32.20	6.37
	29.0	20.80	3.87	24.80	4.96	28.80	6.18	29.90	6.49	30.30	6.52	31.00	6.58	31.80	6.64
	31.0	20.80	4.12	24.80	5.29	28.80	6.60	29.40	6.74	29.80	6.77	30.60	6.83	31.30	6.90
	33.0	20.80	4.39	24.80	5.64	28.60	6.96	29.00	6.99	29.40	7.02	30.10	7.09	30.90	7.16
	35.0	20.80	4.67	24.80	6.00	28.10	7.21	28.50	7.25	28.90	7.29	29.60	7.35	30.40	7.42
	37.0	20.80	4.97	24.80	6.39	27.70	7.47	28.10	7.50	28.40	7.54	29.20	7.62	29.90	7.68
	39.0	20.80	5.28	24.80	6.81	27.20	7.72	27.60	7.76	28.00	7.80	28.70	7.88	29.50	7.96
	42.0	20.80	5.35	24.80	6.89	26.92	7.80	27.32	7.84	27.72	7.87	28.22	7.95	28.32	8.03
	44.0	20.80	5.42	24.80	6.96	26.63	7.87	27.03	7.91	27.43	7.95	27.95	7.97	28.03	8.32
	46.0	20.80	5.56	24 80	7.03	26.38	7.94	26.75	8.03	27.23	8.02	27.65	8.39	27.79	8.41
100%	10.0	18.90	2.48	22.50	3.01	26.20	3.56	28.00	3.85	29.80	4.14	33.50	4.73	35.40	4.90
	12.0	18.90	2.52	22.50	3.07	26.20	3.63	28.00	3.92	29.80	4.22	33.50	4.82	34.90	4.87
	14.0	18.90	2.57	22.50	3.12	26.20	3.70	28.00	4.00	29.80	4.30	33.50	4.92	34.50	4.84
	16.0	18.90	2.62	22.50	3.18	26.20	3.77	28.00	4.07	29.80	4.39	33.30	4.98	34.00	4.93
	18.0	18.90	2.67	22.50	3.24	26.20	3.84	28.00	4.15	29.80	4.47	32.90	5.14	33.60	5.18
	20.0	18.90	2.72	22.50	3.31	26.20	3.96	28.00	4.36	29.80	4.79	32.40	5.38	33.10	5.43
	21.0	18.90	2.75	22.50	3.34	26.20	4.10	28.00	4.52	29.80	4.96	32.20	5.51	32.90	5.56
	23.0	18.90	2.81	22.50	3.56	26.20	4.39	28.00	4.84	29.80	5.32	31.80	5.76	32.40	5.81
	25.0	18.90	3.00	22.50	3.80	26.20	4.70	28.00	5.19	29.80	5.69	31.30	6.01	32.00	6.06
	27.0	18.90	3.20	22.50	4.05	26.20	5.02	28.00	5.55	29.80	6.09	30.80	6.27	31.50	6.32
	29.0	18.90	3.40	22.50	4.33	26.20	5.36	28.00	5.93	29.70	6.47	30.40	6.53	31.10	6.58
	31.0	18.90	3.63	22.50	4.62	26.20	5.72	28.00	6.32	29.30	6.72	29.90	6.78	30.60	6.84
	33.0	18.90	3.85	22.50	4.92	26.20	6.10	28.00	6.75	28.80	6.97	29.50	7.03	30.20	7.10
	35.0	18.90	4.09	22.50	5.23	26.20	6.51	28.00	7.20	28.30	7.23	29.00	7.29	29.70	7.35
	37.0	18.90	4.36	22.50	5.57	26.20	6.94	27.50	7.45	27.90	7.49	28.60	7.56	29.20	7.62
	39.0	18.90	4.63	22.50	5.92	26.20	7.38	27.10	7.70	27.40	7.74	28.10	7.81	28.80	7.89
	42.0	18.90	4.92	22.50	6.21	26.20	7.74	26.54	7.78	27.12	7.90	27.45	8.00	28.24	8.11
	44.0	18.90	5.20	22.50	6.50	26.20	7.85	25.98	7.92	26.87	7.97	28.10	8.10	27.52	8.18
	46.0	18.90	5.49	22.50	6.78	26.20	8.01	25.42	7.99	26.84	8.19	26.98	8.24	27.12	8.32

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
90%	10.0	17.00	2.22	20.30	2.68	23.60	3.16	25.20	3.41	26.80	3.67	30.10	4.19	33.40	4.72
	12.0	17.00	2.26	20.30	2.73	23.60	3.22	25.20	3.47	26.80	3.73	30.10	4.27	33.40	4.81
	14.0	17.00	2.30	20.30	2.77	23.60	3.28	25.20	3.54	26.80	3.80	30.10	4.35	33.40	4.90
	16.0	17.00	2.34	20.30	2.82	23.60	3.35	25.20	3.61	26.80	3.88	30.10	4.43	33.30	4.99
	18.0	17.00	2.38	20.30	2.88	23.60	3.40	25.20	3.68	26.80	3.96	30.10	4.52	32.90	5.14
	20.0	17.00	2.42	20.30	2.95	23.60	3.47	25.20	3.75	26.80	4.10	30.10	4.86	32.40	5.38
	21.0	17.00	2.44	20.30	2.97	23.60	3.53	25.20	3.88	26.80	4.25	30.10	5.03	32.20	5.51
	23.0	17.00	2.49	20.30	3.08	23.60	3.78	25.20	4.16	26.80	4.56	30.10	5.40	31.70	5.76
	25.0	17.00	2.63	20.30	3.30	23.60	4.04	25.20	4.45	26.80	4.87	30.10	5.78	31.30	5.01
	27.0	17.00	2.79	20.30	3.51	23.60	4.32	25.20	4.75	26.80	5.21	30.10	6.19	30.80	5.27
	29.0	17.00	2.98	20.30	3.74	23.60	4.61	25.20	5.07	26.80	5.57	29.80	6.47	30.40	5.52
	31.0	17.00	3.16	20.30	3.99	23.60	4.91	25.20	5.41	26.80	5.94	29.30	6.72	29.90	5.78
	33.0	17.00	3.36	20.30	4.24	23.60	5.24	25.20	5.77	26.80	6.33	28.90	6.98	29.50	7.03
	35.0	17.00	3.57	20.30	4.51	23.60	5.58	25.20	6.15	26.80	6.75	28.40	7.24	29.00	7.29
	37.0	17.00	3.78	20.30	4.79	23.60	5.94	25.20	6.55	26.80	7.20	27.90	7.49	28.60	7.55
	39.0	17.00	4.02	20.30	5.10	23.60	6.32	25.20	6.98	26.80	7.67	27.50	7.75	28.10	7.81
	42.0	17.00	4.20	20.30	5.41	23.60	6.62	25.20	7.22	26.80	7.73	27.24	8.02	27.85	8.06
	44.0	17.00	4.51	20.30	5.72	23.60	6.93	25.20	7.47	26.80	8.03	27.09	8.09	27.49	8.18
	46.0	17.00	4.02	20.30	5.10	23.60	6.31	25.20	6.97	26.80	7.66	27.50	7.75	28.10	7.81
80%	10.0	15.10	1.97	18.00	2.36	20.90	2.77	22.40	2.99	23.90	3.20	26.80	3.66	29.70	4.12
	12.0	15.10	2.00	18.00	2.40	20.90	2.82	22.40	3.05	23.90	3.27	26.80	3.73	29.70	4.20
	14.0	15.10	2.04	18.00	2.44	20.90	2.87	22.40	3.09	23.90	3.33	26.80	3.79	29.70	4.28
	16.0	15.10	2.07	18.00	2.48	20.90	2.93	22.40	3.15	23.90	3.39	26.80	3.87	29.70	4.36
	18.0	15.10	2 .11	18.00	2.53	20.90	2.99	22.40	3.22	23.90	3.45	26.80	3.95	29.70	4.44
	20.0	15.10	2 .14	18.00	2.58	20.90	3.05	22.40	3.28	23.90	3.52	26.80	4.09	29.70	4.75
	21.0	15.10	2 .16	18.00	2.60	20.90	3.08	22.40	3.32	23.90	3.60	26.80	4.24	29.70	4.93
	23.0	15.10	2.20	18.00	2.66	20.90	3.22	22.40	3.53	23.90	3.85	26.80	4.54	29.70	5.29
	25.0	15.10	2.27	18.00	2.82	20.90	3.44	22.40	3.77	23.90	4 .11	26.80	4.86	29.70	5.66
	27.0	15.10	2.42	18.00	3.01	20.90	3.67	22.40	4.03	23.90	4.39	26.80	5.19	29.70	5.05
	29.0	15.10	2.57	18.00	3.20	20.90	3.91	22.40	4.29	23.90	4.70	26.80	5.54	29.70	5.47
	31.0	15.10	2.73	18.00	3.41	20.90	4.16	22.40	4.57	23.90	5.01	26.80	5.92	29.20	5.72
	33.0	15.10	2.90	18.00	3.62	20.90	4.43	22.40	4.87	23.90	5.33	26.80	6.31	28.80	5.97
	35.0	15.10	3.08	18.00	3.85	20.90	4.71	22.40	5.18	23.90	5.68	26.80	6.72	28.30	7.23
	37.0	15.10	3.26	18.00	4.08	20.90	5.02	22.40	5.52	23.90	6.04	26.80	7.17	27.90	7.48
	39.0	15.10	3.45	18.00	4.36	20.90	5.34	22.40	5.87	23.90	6.43	26.80	7.64	27.40	7.74
	42.0	15.10	3.56	18.00	4.41	20.90	5.44	22.40	6.08	23.90	6.59	26.80	7.90	27.18	7.93
	44.0	15.10	3.71	18.00	4.46	20.90	5.54	22.40	6.18	23.90	6.69	26.80	7.95	26.95	8.00
	46.0	15.10	3.45	18.00	4.36	20.90	5.34	22.40	5.87	23.90	6.43	26.80	7.63	27.40	7.74

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
70%	10.0	13.20	1.74	15.80	2.06	18.30	2.40	19.60	2.58	20.90	2.76	23.40	3.14	26.00	3.53
	12.0	13.20	1.76	15.80	2.09	18.30	2.44	19.60	2.63	20.90	2.81	23.40	3.20	26.00	3.60
	14.0	13.20	1.78	15.80	2.12	18.30	2.48	19.60	2.67	20.90	2.86	23.40	3.26	26.00	3.67
	16.0	13.20	1.81	15.80	2.16	18.30	2.53	19.60	2.73	20.90	2.92	23.40	3.32	26.00	3.73
	18.0	13.20	1.84	15.80	2.20	18.30	2.58	19.60	2.77	20.90	2.97	23.40	3.39	26.00	3.81
	20.0	13.20	1.87	15.80	2.24	18.30	2.63	19.60	2.82	20.90	3.03	23.40	3.45	26.00	3.92
	21.0	13.20	1.89	15.80	2.26	18.30	2.65	19.60	2.85	20.90	3.06	23.40	3.50	26.00	4.05
	23.0	13.20	1.92	15.80	2.30	18.30	2.71	19.60	2.95	20.90	3.21	23.40	3.75	26.00	4.35
	25.0	13.20	1.96	15.80	2.40	18.30	2.88	19.60	3.15	20.90	3.42	23.40	4.02	26.00	4.65
	27.0	13.20	2.08	15.80	2.55	18.30	3.08	19.60	3.36	20.90	3.66	23.40	4.29	26.00	4.97
	29.0	13.20	2.20	15.80	2.71	18.30	3.27	19.60	3.58	20.90	3.89	23.40	4.57	26.00	5.31
	31.0	13.20	2.33	15.80	2.87	18.30	3.48	19.60	3.80	20.90	4.14	23.40	4.87	26.00	5.66
	33.0	13.20	2.47	15.80	3.06	18.30	3.71	19.60	4.05	20.90	4.41	23.40	5.19	26.00	6.03
	35.0	13.20	2.62	15.80	3.24	18.30	3.93	19.60	4.31	20.90	4.70	23.40	5.53	26.00	6.43
	37.0	13.20	2.76	15.80	3.43	18.30	4.18	19.60	4.57	20.90	5.00	23.40	5.89	26.00	6.85
	39.0	13.20	2.93	15.80	3.64	18.30	4.43	19.60	4.86	20.90	5.31	23.40	6.26	26.00	7.30
	42.0	13.20	3.10	15.80	3.81	18.30	4.61	19.60	5.08	20.90	5.52	23.40	6.60	26.00	7.73
	44.0	13.20	3.31	15.80	4.03	18.30	4.75	19.60	5.29	20.90	5.74	23.40	6.91	26.00	7.99
	46.0	13.20	3.46	15.80	4.20	18.30	4.95	19.60	5.46	20.90	5.91	23.40	7.12	26.00	8.16
60%	10.0	11.30	1.50	13.50	1.77	15.70	2.05	16.80	2.19	17.90	2.34	20.10	2.65	22.30	2.97
	12.0	11.30	1.53	13.50	1.79	15.70	2.09	16.80	2.23	17.90	2.38	20.10	2.70	22.30	3.02
	14.0	11.30	1.55	13.50	1.82	15.70	2 .11	16.80	2.27	17.90	2.42	20.10	2.75	22.30	3.07
	16.0	11.30	1.57	13.50	1.85	15.70	2 .15	16.80	2.31	17.90	2.46	20.10	2.79	22.30	3.13
	18.0	11.30	1.60	13.50	1.88	15.70	2 .19	16.80	2.35	17.90	2.51	20.10	2.84	22.30	3.19
	20.0	11.30	1.62	13.50	1.92	15.70	2.23	16.80	2.40	17.90	2.56	20.10	2.90	22.30	3.26
	21.0	11.30	1.64	13.50	1.93	15.70	2.25	16.80	2.41	17.90	2.58	20.10	2.93	22.30	3.29
	23.0	11.30	1.66	13.50	1.97	15.70	2.29	16.80	2.46	17.90	2.63	20.10	3.05	22.30	3.50
	25.0	11.30	1.69	13.50	2.00	15.70	2.38	16.80	2.58	17.90	2.79	20.10	3.25	22.30	3.73
	27.0	11.30	1.76	13.50	2.12	15.70	2.53	16.80	2.75	17.90	2.98	20.10	3.46	22.30	3.99
	29.0	11.30	1.85	13.50	2.25	15.70	2.70	16.80	2.93	17.90	3.17	20.10	3.70	22.30	4.26
	31.0	11.30	1.97	13.50	2.39	15.70	2.86	16.80	3 .11	17.90	3.38	20.10	3.93	22.30	4.53
	33.0	11.30	2.08	13.50	2.53	15.70	3.04	16.80	3.31	17.90	3.59	20.10	4.18	22.30	4.83
	35.0	11.30	2.20	13.50	2.69	15.70	3.22	16.80	3.51	17.90	3.81	20.10	4.45	22.30	5.14
	37.0	11.30	2.33	13.50	2.84	15.70	3.41	16.80	3.72	17.90	4.04	20.10	4.73	22.30	5.47
	39.0	11.30	2.45	13.50	3.01	15.70	3.62	16.80	3.95	17.90	4.30	20.10	5.03	22.30	5.82
	42.0	11.30	2.56	13.50	3.18	15.70	3.79	16.80	4.16	17.90	4.51	20.10	5.34	22.30	6.17
	44.0	11.30	2.67	13.50	3.36	15.70	3.97	16.80	4.30	17.90	4.71	20.10	5.63	22.30	6.52
	46.0	11.30	2.45	13.50	3.01	15.70	3.62	16.80	3.95	17.90	4.30	20.10	5.02	22.30	5.82

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
50%	10.0	9.45	1.30	11.30	1.50	13.10	1.72	14.00	1.83	14.90	1.94	16.70	2.18	18.60	2.43
	12.0	9.45	1.31	11.30	1.52	13.10	1.75	14.00	1.85	14.90	1.98	16.70	2.22	18.60	2.47
	14.0	9.45	1.33	11.30	1.54	13.10	1.77	14.00	1.89	14.90	2.01	16.70	2.26	18.60	2.52
	16.0	9.45	1.35	11.30	1.56	13.10	1.79	14.00	1.92	14.90	2.04	16.70	2.30	18.60	2.56
	18.0	9.45	1.37	11.30	1.59	13.10	1.82	14.00	1.95	14.90	2.08	16.70	2.34	18.60	2.61
	20.0	9.45	1.39	11.30	1.61	13.10	1.85	14.00	1.98	14.90	2 .11	16.70	2.38	18.60	2.66
	21.0	9.45	1.40	11.30	1.63	13.10	1.87	14.00	2.00	14.90	2.13	16.70	2.41	18.60	2.69
	23.0	9.45	1.42	11.30	1.65	13.10	1.90	14.00	2.04	14.90	2.17	16.70	2.44	18.60	2.74
	25.0	9.45	1.44	11.30	1.68	13.10	1.94	14.00	2.08	14.90	2.24	16.70	2.57	18.60	2.93
	27.0	9.45	1.46	11.30	1.75	13.10	2.05	14.00	2.21	14.90	2.38	16.70	2.74	18.60	3.12
	29.0	9.45	1.54	11.30	1.84	13.10	2 .17	14.00	2.35	14.90	2.53	16.70	2.91	18.60	3.33
	31.0	9.45	1.63	11.30	1.95	13.10	2.30	14.00	2.49	14.90	2.69	16.70	3.09	18.60	3.54
	33.0	9.45	1.73	11.30	2.07	13.10	2.44	14.00	2.64	14.90	2.85	16.70	3.29	18.60	3.76
	35.0	9.45	1.82	11.30	2.18	13.10	2.58	14.00	2.79	14.90	3.02	16.70	3.49	18.60	4.00
	37.0	9.45	1.92	11.30	2.31	13.10	2.74	14.00	2.96	14.90	3.20	16.70	3.71	18.60	4.25
	39.0	9.45	2.03	11.30	2.44	13.10	2.89	14.00	3.13	14.90	3.40	16.70	3.93	18.60	4.51
	42.0	9.45	2 .14	11.30	2.57	13.10	3.03	14.00	3.33	14.90	3.59	16.70	4.21	18.60	4.79
	44.0	9.45	2.25	11.30	2.71	13.10	3.17	14.00	3.53	14.90	3.68	16.70	4.49	18.60	5.07
	46.0	9.45	2.35	11.30	2.85	13.10	3.31	14.00	3.69	14.90	3.79	16.70	4.77	18.60	5.35

Note:

- *is shown as reference.*
- *In cooling mode, avoid the outdoor air temperature range from 42-46°C, when selecting the models.*
- *The above talbe shows the average value of conditions may operate.*
- *It is recommended to use capacity index less than 130%.*

Heating Mode: 4TVH0096

Table 11

TC: Total Capacity (kW) **WB:** Wet-bulb Temperature **DB:** Dry-bulb Temperature **PI:** Power Input (kW)

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
130%	-19.8	-20	20.40	5.38	20.30	5.75	20.20	6.14	20.20	6.33	20.10	6.51	20.10	6.90
	-18.8	-19	20.70	5.50	20.60	5.87	20.60	6.25	20.50	6.43	20.50	6.61	20.40	6.99
	-16.7	-17	21.50	5.75	21 .40	6 .11	21.30	6.47	21.30	6.65	21.30	6.83	21 .20	7.19
	-13.7	-15	22.40	6.02	22.30	6.36	22.20	6.71	22.20	6.88	22.10	7.06	22.10	7.40
	-11 .8	-13	23.30	6.29	23.30	6.62	23.20	6.95	23.10	7.12	23.10	7.28	23.00	7.61
	-9.8	-11	24.40	6.56	24.30	6.88	24.20	7.20	24.20	7.35	24.20	7.51	24.10	7.83
	-9.5	-10	25.00	6.70	24.90	7.01	24.80	7.31	24.80	7.47	24.70	7.62	24.70	7.93
	-8.5	-9.1	25.50	6.82	25.40	7.12	25.40	7.42	25.30	7.57	25.30	7.72	25.20	8.03
	-7	-7.6	26.40	7.02	26.40	7.31	26.30	7.60	26.30	7.75	26.20	7.89	26.10	8.18
	-5	-5.6	27.80	7.28	27.70	7.56	27.60	7.84	27.60	7.98	27.50	8.10	27.50	8.38
	-3	-3.7	29.10	7.52	29.00	7.79	29.00	8.05	28.90	8.18	28.90	8.31	28.80	8.57
	0	-0.7	31 .40	7.89	31 .40	8.13	31.30	8.37	31.30	8.46	31.20	8.62	31.20	8.86
	3	2.2	33.90	8.21	33.80	8.44	33.70	8.67	33.70	8.78	33.70	8.90	33.60	9 .11
	5	4.1	35.60	8.42	35.50	8.64	35.50	8.85	35.40	8.95	35.40	9.06	35.30	9.27
	7	6	37.40	8.62	37.30	8.82	37.30	9.02	37.20	9.12	37.20	9.22	35.70	8.86
	9	7.9	39.30	8.80	39.20	8.99	39.20	9.18	39.10	9.28	38.30	9.08	35.70	8.32
	11	9.8	41.30	8.97	41.20	9.15	41.00	9.27	39.60	8.90	38.30	8.54	35.70	7.84
	13	11.8	43.50	9.14	43.40	9.32	41.00	8.69	39.60	8.34	38.30	8.02	35.70	7.35
	15	13.7	45.60	9.30	43.60	8.83	41.00	8.18	39.60	7.87	38.30	7.55	35.70	6.94
120%	-19.8	-20	20.30	5.89	20.20	6.24	20.10	6.59	20.10	6.76	20.10	6.94	20.00	7.29
	-18.8	-19	20.60	6.00	20.50	6.35	20.50	6.69	20.40	6.86	20.40	7.04	20.30	7.38
	-16.7	-17	21.40	6.24	21.30	6.57	21.17	6.90	21.20	7.07	21.20	7.23	21 .10	7.56
	-13.7	-15	22.30	6.48	22.20	6.80	22.10	7.12	22.10	7.28	22.10	7.44	22.00	7.76
	-11 .8	-13	23.20	6.73	23.20	7.04	23.10	7.34	23.10	7.50	23.00	7.65	23.00	7.96
	-9.8	-11	24.30	6.99	24.20	7.27	24.20	7.57	24.10	7.72	24.10	7.86	24.00	8.15
	-9.5	-10	24.90	7.12	24.80	7.40	24.70	7.68	24.70	7.83	24.70	7.97	24.60	8.25
	-8.5	-9.1	25.40	7.22	25.30	7.50	25.30	7.78	25.20	7.92	25.20	8.07	25.10	8.34
	-7	-7.6	26.30	7.41	26.30	7.68	26.20	7.95	26.20	8.08	26.10	8.21	26.10	8.48
	-5	-5.6	27.70	7.65	27.60	7.91	27.50	8.16	27.50	8.29	27.50	8.42	27.40	8.67
	-3	-3.7	29.00	7.88	29.00	8.12	28.90	8.36	28.90	8.48	28.80	8.61	28.80	8.85
	0	-0.7	31.30	8.21	31.30	8.44	31.20	8.66	31.20	8.78	31 .10	8.88	31 .10	9 .11
	3	2.2	33.80	8.52	33.70	8.73	33.70	8.93	33.60	9.04	33.60	9.14	32.90	9.09
	5	4.1	35.50	8.71	35.40	8.91	35.40	9.10	35.30	9.20	35.30	9.30	32.90	8.54
	7	6	37.30	8.88	37.30	9.07	37.20	9.26	36.60	9.13	35.40	8.76	32.90	8.04
	9	7.9	39.20	9.06	39.10	9.24	37.80	8.93	36.60	8.58	35.40	8.23	32.90	7.56
	11	9.8	41 .20	9.22	40.20	9.06	37.80	8.40	36.60	8.07	35.40	7.75	32.90	7.13
	13	11.8	42.70	9.13	40.20	8.50	37.80	7.88	36.60	7.58	35.40	7.28	32.90	6.70
	15	13.7	42.70	8.60	40.20	8.01	37.80	7.43	36.60	7.15	35.40	6.87	32.90	6.32

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
110%	-19.8	-20	20.20	6.40	20.10	6.72	20.00	7.05	20.00	7.21	20.01	7.36	19.90	7.69
	-18.8	-19	20.50	6.50	20.40	6.82	20.40	7.14	20.40	7.29	20.30	7.45	20.30	7.77
	-16.7	-17	21.30	6.72	21 .20	7.03	21.50	7.33	21 .10	7.48	21 .10	7.64	21.00	7.94
	-13.7	-15	22.20	6.95	22 .10	7.24	22.00	7.53	22.00	7.68	22.00	7.83	21.90	8 .11
	-11 .8	-13	23.10	7.18	23 .10	7.46	23.00	7.74	23.00	7.88	22.90	8.02	22.90	8.30
	-9.8	-11	24.20	7.41	24.10	7.68	24.10	7.95	24.00	8.08	24.00	8.21	24.00	8.48
	-9.5	-10	24.80	7.53	24.70	7.79	24.60	8.06	24.60	8.18	24.60	8.31	24.50	8.57
	-8.5	-9.1	25.30	7.63	25.20	7.89	25.20	8.14	25.10	8.27	25.10	8.40	25.10	7.66
	-7	-7.6	26.20	7.81	26.20	8.04	26.10	8.29	26.10	8.42	26.10	8.54	26.00	8.79
	-5	-5.6	27.60	8.03	27.50	8.26	27.40	8.49	27.40	8.61	27.40	8.73	27.30	8.97
	-3	-3.7	28.90	8.23	28.90	8.45	28.80	8.68	28.80	8.79	28.70	8.90	28.70	9.12
	0	-0.7	31 .20	8.54	31.20	8.75	31.10	8.95	31 .10	9.05	31 .10	9.16	30.20	8.98
	3	2.2	33.70	8.83	33.60	9.01	33.60	9.20	33.50	9.29	32.40	8.91	30.20	8.17
	5	4.1	35.40	8.99	35.40	9.18	34.70	9.09	33.50	8.73	32.40	8.38	30.20	7.69
	7	6	37.20	9.16	36.90	9.22	34.70	8.54	33.50	8.20	32.40	7.88	30.20	7.23
	9	7.9	39.10	9.31	36.90	8.67	34.70	8.03	33.50	7.72	32.40	7.41	30.20	6.82
	11	9.8	39.10	8.76	36.90	8.15	34.70	7.56	33.50	7.27	32.40	6.99	30.20	6.43
	13	11.8	39.10	8.21	36.90	7.65	34.70	7.11	33.50	6.84	32.40	6.57	30.20	6.06
	15	13.7	39.10	7.29	36.90	7.21	34.70	6.71	33.50	6.45	32.40	6.22	30.20	5.73
100%	-19.8	-20	20.10	6.92	20.00	7.21	20.00	7.50	19.90	7.65	19.90	7.79	19.80	8.08
	-18.8	-19	20.40	7.01	20.40	7.29	20.30	7.58	20.30	7.73	20.20	7.88	20.20	8.16
	-16.7	-17	21 .20	7.21	21 .10	7.48	21 .10	7.76	21.00	7.90	21.00	8.03	21.00	8.31
	-13.7	-15	22 .10	7.41	22.00	7.68	21.90	7.95	21.90	8.08	21.90	8.21	21.80	8.48
	-11 .8	-13	23.00	7.63	23.00	7.88	22.90	8.13	22.90	8.26	22.90	8.39	22.80	8.65
	-9.8	-11	24.10	7.84	24.00	8.08	24.00	8.32	24.00	8.45	23.90	8.57	23.90	8.81
	-9.5	-10	24.70	7.95	24.60	8.18	24.60	8.42	24.50	8.54	24.50	8.66	24.40	8.89
	-8.5	-9.1	25.20	8.03	25.10	8.27	25.10	8.50	25.10	8.62	25.00	8.74	25.00	8.96
	-7	-7.6	26.10	8.19	26.10	8.42	26.00	8.64	26.00	8.76	26.00	8.86	25.90	9.09
	-5	-5.6	27.50	8.40	27.40	8.61	27.40	8.83	27.30	8.92	27.30	9.03	27.20	9.25
	-3	-3.7	28.80	8.59	28.80	7.80	28.70	8.99	28.70	9.09	28.70	9.19	27.50	8.81
	0	-0.7	31.10	8.86	31 .10	9.05	31.00	9.24	30.50	9.09	29.50	8.72	27.50	8.00
	3	2.2	33.60	9.12	33.50	9.29	31.50	8.60	30.50	8.26	29.50	7.94	27.50	7.28
	5	4.1	35.30	9.29	33.50	8.73	31.50	8.08	30.50	7.78	29.50	7.47	27.50	6.87
	7	6	35.50	8.82	33.50	8.20	31.50	7.61	30.50	7.32	29.50	7.04	27.50	6.47
	9	7.9	35.50	8.28	33.50	7.72	31.50	7.17	30.50	6.81	29.50	6.63	27.50	6 .11
	11	9.8	35.50	7.80	33.50	7.27	31.50	6.76	30.50	6.50	29.50	6.26	27.50	5.77
	13	11.8	35.50	7.32	33.50	6.84	31.50	6.37	30.50	6.13	29.50	5.90	27.50	5.45
	15	13.7	35.50	6.91	33.50	6.45	31.50	6.01	30.50	5.79	29.50	5.57	27.50	5.16

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
90%	-19.8	-20	19.96	7.43	19.86	7.69	19.86	7.96	19.77	8.08	19.77	8.22	19.77	8.48
	-18.8	-19	20.26	7.51	20.26	7.78	20.17	8.03	20.17	8.16	20.17	8.29	20.06	8.55
	-16.7	-17	21 .06	7.70	20.96	7.95	20.96	8.19	20.96	8.32	20.86	8.44	20.86	8.69
	-13.7	-15	21 .96	7.89	21 .86	8.12	21.86	8.36	21.76	8.48	21.76	8.60	21.76	8.84
	-11 .8	-13	22.86	8.07	22.86	8.30	22.76	8.53	22.76	8.65	22.76	8.76	22.66	8.98
	-9.8	-11	23.96	8.26	23.96	8.48	23.86	8.70	23.86	8.81	23.86	8.92	23.76	9.14
	-9.5	-10	24.56	8.36	24.46	8.58	24.46	8.79	24.36	8.89	24.36	9.00	24.36	9.21
	-8.5	-9.1	25.06	8.45	25.06	8.66	24.96	8.86	24.96	8.96	24.96	9.07	24.66	9.16
	-7	-7.6	25.95	8.59	25.95	8.79	25.86	8.99	25.86	9.09	25.86	9.19	24.66	8.75
	-5	-5.6	27.35	8.78	27.25	8.96	27.25	9.15	27.15	9.25	26.45	8.96	24.66	8.22
	-3	-3.7	28.65	8.94	28.65	9.12	28.35	9.16	27.35	8.80	26.45	8.44	24.66	7.75
	0	-0.7	31 .05	9.20	30.15	8.97	28.35	8.31	27.35	7.99	26.45	7.67	24.66	7.05
	3	2.2	31 .94	8.77	30.15	8.16	28.35	7.57	27.35	7.28	26.45	7.00	24.66	6.44
	5	4.1	31 .94	8.24	30.15	7.68	28.35	7.14	27.35	6.86	26.45	6.60	24.66	6.08
	7	6	31.94	7.75	30.15	7.23	28.35	6.72	27.35	6.47	26.45	6.23	24.66	5.74
	9	7.9	31 .94	7.30	30.15	6.81	28.35	6.33	27.35	6 .11	26.45	5.88	24.66	5.43
	11	9.8	31 .94	6.88	30 .15	6.42	28.35	5.99	27.35	5.77	26.45	5.55	24.66	5.14
	13	11.8	31 .94	6.47	30 .15	6.06	28.35	5.64	27.35	5.45	26.45	5.25	24.66	4.85
	15	13.7	31 .94	6.12	30 .15	5.72	28.35	5.35	27.35	5.16	26.45	4.97	24.66	4.61
80%	-19.8	-20	19.90	7.95	19.80	8.17	19.80	8.41	19.80	8.53	19.70	8.65	19.70	8.87
	-18.8	-19	20.20	8.01	20.20	8.25	20.10	8.48	20.10	8.60	20.10	8.71	20.00	8.94
	-16.7	-17	21 .00	8.18	20.90	8.40	20.90	8.63	20.90	8.74	20.90	8.84	20.80	9.06
	-13.7	-15	21 .90	8.35	21 .80	8.56	21.80	8.78	21.80	8.87	21.70	8.98	21.70	9.20
	-11 .8	-13	22.80	8.52	22.80	8.73	22.70	8.92	22.70	9.02	22.70	9.13	22.00	8.88
	-9.8	-11	23.90	8.69	23.90	8.88	23.80	9.08	23.80	9.17	23.60	9.15	22.00	8.39
	-9.5	-10	24.50	8.78	24.40	8.96	24.40	9.15	24.40	9.25	23.60	8.88	22.00	8.14
	-8.5	-9.1	25.00	8.85	23.24	9.04	24.90	9.22	24.40	9.01	23.60	8.65	22.00	7.93
	-7	-7.6	25.90	8.98	25.90	9.16	25.20	8.96	24.40	8.61	23.60	8.26	22.00	7.58
	-5	-5.6	27.30	9.14	26.80	9.09	25.20	8.42	24.40	8.09	23.60	7.77	22.00	7.14
	-3	-3.7	28.40	9.19	26.80	8.56	25.20	7.93	24.40	7.63	23.60	7.32	22.00	6.74
	0	-0.7	28.40	8.34	26.80	7.77	25.20	7.21	24.40	6.95	23.60	6.67	22.00	6.15
	3	2.2	28.40	7.60	26.80	7.09	25.20	6.59	24.40	6.34	23.60	6.11	22.00	5.63
	5	4.1	28.40	7.16	26.80	6.68	25.20	6.22	24.40	5.99	23.60	5.77	22.00	5.33
	7	6	28.40	6.74	26.80	6.31	25.20	5.87	24.40	5.66	23.60	5.46	22.00	5.04
	9	7.9	28.40	6.36	26.80	5.95	25.20	5.54	24.40	5.35	23.60	5.16	22.00	4.77
	11	9.8	28.40	6.01	26.80	5.62	25.20	5.25	24.40	5.06	23.60	4.88	22.00	4.53
	13	11.8	28.40	5.66	26.80	5.31	25.20	4.96	24.40	4.78	23.60	4.62	22.00	4.28
	15	13.7	28.40	5.36	26.80	5.03	25.20	4.70	24.40	4.54	23.60	4.38	22.00	4.07

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
70%	-19.8	-20	19.75	8.46	19.66	8.66	19.66	8.86	19.66	8.96	19.66	9.07	19.16	8.97
	-18.8	-19	20.05	8.53	20.05	8.73	19.96	8.92	19.96	9.02	19.96	9.13	19.16	8.79
	-16.7	-17	20.85	8.67	20.85	8.86	20.75	9.05	20.75	9.15	20.55	8.15	19.16	8.38
	-13.7	-15	21.75	8.82	21 .65	9.00	21.65	9.19	21.25	9.05	20.55	8.69	19.16	7.97
	-11 .8	-13	22.65	8.96	22.65	9.14	22.05	8.92	21.25	8.58	20.55	8.23	19.16	7.55
	-9.8	-11	23.75	9 .11	23.45	9.10	22.05	8.43	21.25	8.10	20.55	7.78	19 .16	7.15
	-9.5	-10	24.35	9.19	23.45	8.84	22.05	8.18	21.25	7.87	20.55	7.56	19 .16	6.95
	-8.5	-9.1	24.84	9.24	23.45	8.60	22.05	7.97	21.25	7.66	20.55	7.36	19.16	6.77
	-7	-7.6	24.84	8.82	23.45	8.21	22.05	7.62	21.25	7.33	20.55	7.05	19.16	6.48
	-5	-5.6	24.84	8.29	23.45	7.73	22.05	7.17	21.25	6.90	20.55	8.15	19.16	6.12
	-3	-3.7	24.84	7.81	23.45	7.28	22.05	6.77	21.25	6.51	20.55	6.27	19.16	5.78
	0	-0.7	24.84	7 .11	23.45	6.64	22.05	6.18	21.25	5.95	20.55	5.73	19 .16	5.30
	3	2.2	24.84	6.49	23.45	6.08	22.05	5.66	21.25	5.46	20.55	5.26	19 .16	4.86
	5	4.1	24.84	6.13	23.45	5.73	22.05	5.36	21.25	5.16	20.55	4.97	19 .16	4.61
	7	6	24.84	5.79	23.45	5.43	22.05	5.06	21.25	4.88	20.55	4.71	19.16	4.37
	9	7.9	24.84	5.47	23.45	5.13	22.05	4.79	21.25	4.63	20.55	4.47	19 .16	4.14
	11	9.8	24.84	5.18	23.45	4.85	22.05	4.55	21 .25	4.39	20.55	4.24	19.16	3.93
	13	11.8	24.84	4.89	23.45	4.60	22.05	4.30	21.25	4.16	20.55	4.01	19.16	3.74
	15	13.7	24.84	4.63	23.45	4.36	22.05	4.08	21.25	3.95	20.55	3.81	19 .16	3.56
60%	-19.8	-20	19.70	8.97	19.60	9.14	18.90	8.80	18.30	8.45	17.70	8 .11	16.50	7.44
	-18.8	-19	20.00	9.03	20.00	9.20	18.90	8.61	18.30	8.27	17.70	7.94	16.50	7.28
	-16.7	-17	20.80	9.15	20.10	8.86	18.90	8.21	18.30	7.90	17.70	7.58	16.50	6.97
	-13.7	-15	21.30	9.05	20.10	8.42	18.90	7.81	18.30	7.51	17.70	7.21	16.50	6.63
	-11 .8	-13	21.30	8.57	20 .10	7.97	18.90	7.40	18.30	7.13	17.70	6.85	16.50	6.33
	-9.8	-11	21.30	8.09	20.10	7.54	18.90	7.01	18.30	6.74	17.70	6.48	16.50	5.98
	-9.5	-10	21.30	7.87	20.10	7.33	18.90	6.81	18.30	6.56	17.70	6.30	16.50	5.81
	-8.5	-9.1	21.30	7.66	20.10	7.15	18.90	6.64	18.30	6.39	17.70	6.15	16.50	5.67
	-7	-7.6	21.30	7.32	20.10	6.84	18.90	6.35	18.30	6.13	17.70	5.89	16.50	5.45
	-5	-5.6	21.30	6.90	20.10	6.44	18.90	6.00	18.30	5.78	17.70	5.56	16.50	5.15
	-3	-3.7	21.30	6.51	20.10	6.09	18.90	5.67	18.30	5.47	17.70	5.27	16.50	4.87
	0	-0.7	21.30	5.95	20.10	5.57	18.90	5.20	18.30	5.02	17.70	4.83	16.50	4.48
	3	2.2	21.30	5.46	20.10	5.12	18.90	4.78	18.30	4.61	17.70	4.46	16.50	4.13
	5	4.1	21.30	5.16	20.10	4.84	18.90	4.53	18.30	4.38	17.70	4.22	16.50	3.92
	7	6	21.30	4.88	20.10	4.59	18.90	4.29	18.30	4.15	17.70	4.01	16.50	3.73
	9	7.9	21.30	4.62	20.10	4.35	18.90	4.07	18.30	3.94	17.70	3.80	16.50	3.55
	11	9.8	21.30	4.39	20 .10	4.13	18.90	3.87	18.30	3.75	17.70	3.62	16.50	3.38
	13	11.8	21.30	4.15	20 .10	3.91	18.90	3.68	18.30	3.56	17.70	3.44	16.50	3.21
	15	13.7	21.30	3.95	20 .10	3.72	18.90	3.50	18.30	3.39	17.70	3.28	16.50	3.06

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
50%	-19.8	-20	17.74	8.16	16.75	7.60	15.75	7.06	15.15	6.80	14.65	6.53	13.66	6.02
	-18.8	-19	17.74	7.98	16.75	7.44	15.75	6.92	15.15	6.65	14.65	6.39	13.66	5.90
	-16.7	-17	17.74	7.62	16.75	7 .11	15.75	6.61	15.15	6.36	14.65	6.13	13.66	5.65
	-13.7	-15	17.74	7.25	16.75	6.77	15.75	6.29	15.15	6.07	14.65	5.84	13.66	5.40
	-11 .8	-13	17.74	6.89	16.75	6.43	15.75	5.99	15.15	5.77	14.65	5.55	13.66	5.14
	-9.8	-11	17.74	6.52	16.75	6.10	15.75	5.68	15.15	5.47	14.65	5.28	13.66	4.88
	-9.5	-10	17.74	6.34	16.75	5.93	15.75	5.53	15.15	5.34	14.65	5.14	13.66	4.75
	-8.5	-9.1	17.74	6.19	16.75	5.79	15.75	5.40	15.15	5.21	14.65	5.02	13.66	4.64
	-7	-7.6	17.74	5.93	16.75	5.55	15.75	5.18	15.15	5.00	14.65	4.82	13.66	4.47
	-5	-5.6	17.74	5.59	16.75	5.25	15.75	4.90	15.15	4.73	14.65	4.57	13.66	4.23
	-3	-3.7	17.74	5.30	16.75	4.97	15.75	4.64	15.15	4.49	14.65	4.33	13.66	4.02
	0	-0.7	17.74	4.86	16.75	4.57	15.75	4.28	15.15	4.13	14.65	3.99	13.66	3.72
	3	2.2	17.74	4.48	16.75	4.21	15.75	3.94	15.15	3.81	14.65	3.69	13.66	3.44
	5	4.1	17.74	4.25	16.75	3.99	15.75	3.75	15.15	3.63	14.65	3.51	13.66	3.27
	7	6	17.74	4.03	16.75	3.79	15.75	3.57	15.15	3.45	14.65	3.34	13.66	3.12
	9	7.9	17.74	3.82	16.75	3.61	15.75	3.39	15.15	3.29	14.65	3.18	13.66	2.97
	11	9.8	17.74	3.64	16.75	3.43	15.75	3.23	15.15	3.13	14.65	3.03	13.66	2.84
	13	11.8	17.74	3.46	16.75	3.26	15.75	3.07	15.15	2.98	14.65	2.89	13.66	2.71
	15	13.7	17.74	3.29	16.75	3.11	15.75	2.94	15.15	2.85	14.65	2.76	13.66	2.59

Note:

- *is shown as reference.*
- *In heating mode, avoid the outdoor air temperature range from -15–20 °C, when selecting the models.*
- *The above talbe shows the average value of conditions may operate.*
- *It is recommended to use capacity index less than 130%.*

Cooling Mode: 4TVH0115

Table 12

TC: Total Capacity (kW) **WB:** Wet-bulb Temperature **DB:** Dry-bulb Temperature **PI:** Power Input (kW)

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
130%	10.0	29.43	4.17	35.05	5.10	40.68	6.06	42.23	6.20	42.71	6.07	43.79	5.82	44.86	5.55
	12.0	29.43	4.24	35.05	5.20	40.68	6.18	41.63	6.16	42.23	6.04	43.19	5.77	44.27	5.68
	14.0	29.43	4.33	35.05	5.29	40.56	6.26	41.16	6.18	41.63	6.00	42.71	5.95	43.79	6.01
	16.0	29.43	4.40	35.05	5.40	40.08	6.23	40.56	6.14	41.04	6.21	42.11	6.27	43.19	6.33
	18.0	29.43	4.49	35.05	5.51	39.48	6.46	39.96	6.50	40.56	6.54	41.63	6.60	42.71	6.66
	20.0	29.43	4.59	35.05	5.87	38.88	6.78	39.48	6.82	39.96	6.86	41.04	6.92	42.11	6.99
	21.0	29.43	4.71	35.05	6.07	38.64	6.94	39.24	6.98	39.72	7.01	40.80	7.09	41.87	7.15
	23.0	29.43	5.05	35.05	6.51	38.16	7.26	38.64	7.29	39.12	7.33	40.20	7.40	41.27	7.48
	25.0	29.43	5.39	35.05	6.98	37.57	7.57	38.04	7.61	38.64	7.66	39.72	7.73	40.80	7.81
	27.0	29.43	5.76	35.05	7.47	37.09	7.89	37.57	7.94	38.04	7.98	39.12	8.06	40.20	8.15
	29.0	29.43	6.15	35.05	7.98	36.49	8.21	36.97	8.26	37.57	8.31	38.64	8.39	39.72	8.48
	31.0	29.43	6.56	34.94	8.44	35.89	8.54	36.49	8.59	36.97	8.62	38.04	8.72	39.12	8.82
	33.0	29.43	6.99	34.33	8.76	35.41	8.86	35.89	8.90	36.49	8.95	37.57	9.05	38.52	9.15
	35.0	29.43	7.45	33.74	9.07	34.81	9.18	35.41	9.23	35.89	9.28	36.97	9.39	38.04	9.49
	37.0	29.43	7.93	33.26	9.40	34.34	9.51	34.81	9.56	35.41	9.62	36.37	9.73	37.45	9.84
	39.0	29.43	8.44	32.66	9.50	33.74	9.83	34.34	9.89	34.81	9.95	35.89	10.06	36.97	10.18
	42.0	29.43	8.88	32.32	9.59	33.38	9.92	33.98	9.98	34.46	10.05	35.54	10.08	35.55	10.28
	44.0	29.43	9.34	31.99	9.69	33.03	9.98	33.63	10.08	33.75	10.07	34.24	10.12	34.70	10.32
	46.0	29.43	9.79	31.85	9.78	32.68	10.11	33.27	10.11	33.47	10.14	33.64	10.16	34.17	10.66
120%	10.0	27.16	3.81	32.30	4.65	37.57	5.53	40.20	5.98	42.11	6.23	43.07	5.99	44.03	5.76
	12.0	27.16	3.88	32.30	4.73	37.57	5.63	40.20	6.09	41.52	6.20	42.47	5.96	43.43	5.72
	14.0	27.16	3.95	32.30	4.83	37.57	5.74	40.20	6.21	40.92	6.16	41.99	5.93	42.95	5.96
	16.0	27.16	4.02	32.30	4.93	37.57	5.85	39.96	6.26	40.44	6.17	41.40	6.23	42.35	6.28
	18.0	27.16	4.10	32.30	5.03	37.57	6.05	39.36	6.46	39.84	6.49	40.80	6.55	41.87	6.61
	20.0	27.16	4.18	32.30	5.22	37.57	6.51	38.88	6.78	39.36	6.81	40.32	6.87	41.28	6.93
	21.0	27.16	4.22	32.30	5.40	37.57	6.75	38.52	6.94	39.00	6.96	40.08	7.03	41.04	7.10
	23.0	27.16	4.51	32.30	5.79	37.57	7.22	38.05	7.25	38.52	7.28	39.48	7.36	40.44	7.42
	25.0	27.16	4.82	32.30	6.20	36.97	7.54	37.45	7.56	37.93	7.60	39.00	7.67	39.96	7.74
	27.0	27.16	5.15	32.30	6.62	36.49	7.84	36.97	7.89	37.45	7.93	38.40	8.00	39.36	8.07
	29.0	27.16	5.49	32.30	7.07	35.89	8.16	36.37	8.21	36.85	8.24	37.81	8.33	38.88	8.40
	31.0	27.16	5.85	32.30	7.55	35.29	8.49	35.89	8.53	36.37	8.57	37.33	8.66	38.28	8.75
	33.0	27.16	6.23	32.30	8.05	34.81	8.81	35.29	8.85	35.77	8.89	36.73	8.99	37.69	9.07
	35.0	27.16	6.64	32.30	8.59	34.22	9.12	34.70	9.17	35.29	9.22	36.25	9.32	37.21	9.42
	37.0	27.16	7.06	32.30	9.15	33.74	9.45	34.22	9.50	34.70	9.55	35.65	9.65	36.61	9.76
	39.0	27.16	7.51	32.18	9.66	33.14	9.77	33.62	9.83	34.10	9.88	35.17	9.99	36.13	10.09
	42.0	27.16	7.79	31.84	9.75	32.79	9.86	33.27	9.92	33.75	9.97	34.83	10.03	34.74	10.19
	44.0	27.16	7.88	31.67	9.84	32.45	9.94	32.93	9.95	33.41	10.00	33.79	10.06	34.35	10.55
	46.0	27.16	7.97	31.49	9.94	32.17	10.05	32.58	10.11	33.16	10.13	33.44	10.09	34.05	10.14

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
110%	10.0	24.89	3.45	29.67	4.21	34.46	5.00	36.85	5.40	39.24	5.82	42.24	6.17	43.19	5.96
	12.0	24.89	3.53	29.67	4.29	34.46	5.10	36.85	5.51	39.24	5.93	41.76	6.15	42.59	5.93
	14.0	24.89	3.59	29.67	4.37	34.46	5.20	36.85	5.61	39.24	6.04	41.16	6.11	42.12	5.92
	16.0	24.89	3.65	29.67	4.45	34.46	5.29	36.85	5.72	39.24	6.16	40.68	6.18	41.52	6.25
	18.0	24.89	3.72	29.67	4.54	34.46	5.40	36.85	5.88	39.24	6.45	40.08	6.50	41.04	6.56
	20.0	24.89	3.79	29.67	4.64	34.46	5.72	36.85	6.32	38.65	6.77	39.60	6.82	40.44	6.88
	21.0	24.89	3.83	29.67	4.77	34.46	5.93	36.85	6.55	38.41	6.93	39.25	6.98	40.20	7.04
	23.0	24.89	4.01	29.67	5.11	34.46	6.36	36.85	7.03	37.81	7.23	38.77	7.30	39.60	7.37
	25.0	24.89	4.28	29.67	5.46	34.46	6.79	36.85	7.53	37.33	7.55	38.17	7.62	39.12	7.68
	27.0	24.89	4.56	29.67	5.84	34.46	7.27	36.25	7.84	36.73	7.87	37.69	7.94	38.53	8.01
	29.0	24.89	4.87	29.67	6.23	34.46	7.77	35.77	8.16	36.25	8.20	37.09	8.27	38.05	8.34
	31.0	24.89	5.18	29.67	6.65	34.46	8.29	35.18	8.48	35.65	8.51	36.61	8.59	37.45	8.67
	33.0	24.89	5.51	29.67	7.09	34.22	8.75	34.70	8.79	35.18	8.83	36.01	8.92	36.97	9.00
	35.0	24.89	5.87	29.67	7.55	33.62	9.06	34.10	9.11	34.58	9.16	35.42	9.25	36.37	9.33
	37.0	24.89	6.25	29.67	8.04	33.14	9.39	33.62	9.43	33.98	9.48	34.94	9.58	35.77	9.66
	39.0	24.89	6.64	29.67	8.56	32.54	9.71	33.02	9.76	33.50	9.81	34.34	9.90	35.30	10.00
	42.0	24.89	6.73	29.67	8.65	32.20	9.80	32.68	9.85	33.16	9.90	33.76	10.00	33.88	10.09
	44.0	24.89	6.82	29.67	8.75	31.86	9.89	32.34	9.94	32.82	9.99	33.44	10.02	33.54	10.46
	46.0	24.89	6.99	29.67	8.84	31.56	9.98	32.00	10.09	32.57	10.08	33.08	10.54	33.25	10.57
100%	10.0	22.61	3.12	26.92	3.78	31.35	4.48	33.50	4.84	35.65	5.21	40.08	5.95	42.35	6.16
	12.0	22.61	3.17	26.92	3.85	31.35	4.56	33.50	4.93	35.65	5.31	40.08	6.06	41.75	6.12
	14.0	22.61	3.23	26.92	3.93	31.35	4.65	33.50	5.03	35.65	5.40	40.08	6.18	41.28	6.09
	16.0	22.61	3.29	26.92	4.00	31.35	4.74	33.50	5.12	35.65	5.51	39.84	6.26	40.68	6.20
	18.0	22.61	3.35	26.92	4.07	31.35	4.83	33.50	5.22	35.65	5.62	39.36	6.46	40.20	6.51
	20.0	22.61	3.42	26.92	4.16	31.35	4.98	33.50	5.49	35.65	6.03	38.76	6.77	39.60	6.83
	21.0	22.61	3.45	26.92	4.20	31.35	5.16	33.50	5.68	35.65	6.23	38.53	6.93	39.36	6.99
	23.0	22.61	3.54	26.92	4.48	31.35	5.53	33.50	6.09	35.65	6.68	38.05	7.24	38.76	7.31
	25.0	22.61	3.77	26.92	4.78	31.35	5.92	33.50	6.53	35.65	7.16	37.45	7.56	38.28	7.62
	27.0	22.61	4.02	26.92	5.10	31.35	6.32	33.50	6.98	35.65	7.66	36.85	7.88	37.69	7.95
	29.0	22.61	4.28	26.92	5.44	31.35	6.74	33.50	7.45	35.53	8.14	36.37	8.21	37.21	8.27
	31.0	22.61	4.56	26.92	5.81	31.35	7.20	33.50	7.95	35.05	8.45	35.77	8.53	36.61	8.60
	33.0	22.61	4.84	26.92	6.18	31.35	7.67	33.50	8.49	34.46	8.77	35.30	8.84	36.13	8.93
	35.0	22.61	5.15	26.92	6.57	31.35	8.18	33.50	9.05	33.86	9.09	34.70	9.17	35.53	9.25
	37.0	22.61	5.48	26.92	7.00	31.35	8.72	32.90	9.37	33.38	9.42	34.22	9.50	34.94	9.57
	39.0	22.61	5.82	26.92	7.44	31.35	9.28	32.42	9.68	32.78	9.73	33.62	9.82	34.46	9.92
	42.0	22.61	6.18	26.92	7.80	31.35	9.73	31.75	9.77	32.44	9.93	32.84	10.05	33.79	10.19
	44.0	22.61	6.54	26.92	8.16	31.35	9.86	31.08	9.96	32.14	10.02	33.62	10.18	32.93	10.28
	46.0	22.61	6.90	26.92	8.53	31.35	10.07	30.41	10.05	32.11	10.29	32.28	10.36	32.45	10.46

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
90%	10.0	20.34	2.79	24.29	3.37	28.24	3.98	30.15	4.29	32.06	4.61	36.01	5.27	39.96	5.94
	12.0	20.34	2.84	24.29	3.43	28.24	4.05	30.15	4.36	32.06	4.70	36.01	5.37	39.96	6.05
	14.0	20.34	2.89	24.29	3.49	28.24	4.12	30.15	4.45	32.06	4.78	36.01	5.46	39.96	6.16
	16.0	20.34	2.94	24.29	3.55	28.24	4.21	30.15	4.54	32.06	4.88	36.01	5.57	39.84	6.27
	18.0	20.34	2.99	24.29	3.62	28.24	4.28	30.15	4.62	32.06	4.98	36.01	5.68	39.36	6.46
	20.0	20.34	3.05	24.29	3.71	28.24	4.37	30.15	4.72	32.06	5.16	36.01	6.11	38.76	6.77
	21.0	20.34	3.07	24.29	3.73	28.24	4.44	30.15	4.88	32.06	5.34	36.01	6.33	38.53	6.93
	23.0	20.34	3.13	24.29	3.88	28.24	4.76	30.15	5.23	32.06	5.73	36.01	6.79	3/.93	7.24
	25.0	20.34	3.30	24.29	4.15	28.24	5.09	30.15	5.60	32.06	6.12	36.01	7.27	3/.45	7.56
	27.0	20.34	3.51	24.29	4.42	28.24	5.43	30.15	5.98	32.06	6.55	36.01	7.78	36.85	7.88
	29.0	20.34	3.74	24.29	4.71	28.24	5.79	30.15	6.38	32.06	7.00	35.65	8.14	36.37	8.20
	31.0	20.34	3.98	24.29	5.01	28.24	6.17	30.15	6.81	32.06	7.46	35.06	8.45	35.77	8.52
	33.0	20.34	4.22	24.29	5.33	28.24	6.59	30.15	7.26	32.06	7.96	34.58	8.78	35.29	8.84
	35.0	20.34	4.49	24.29	5.67	28.24	7.01	30.15	7.73	32.06	8.49	33.98	9.10	34./0	9.17
	37.0	20.34	4.76	24.29	6.03	28.24	7.46	30.15	8.23	32.06	9.05	33.38	9.42	34.22	9.49
	39.0	20.34	5.05	24.29	6.42	28.24	7.94	30.15	8.77	32.06	9.64	32.90	9.75	33.62	9.82
	42.0	20.34	5.28	24.29	6.80	28.24	8.33	30.15	9.08	32.06	9.71	32.60	10.08	33.32	10.13
	44.0	20.34	5.67	24.29	7.19	28.24	8.71	30.15	9.39	32.06	10.09	32.42	10.17	32.89	10.28
	46.0	20.34	5.98	24.29	7.50	28.24	9.02	30.15	9.70	32.06	10.26	32.23	10.29	32.31	10.40
80%	10.0	18.07	2.48	21.54	2.96	25.00	3.49	26.80	3.76	28.60	4.03	32.06	4.60	35.53	5.18
	12.0	18.07	2.51	21.54	3.01	25.00	3.55	26.80	3.83	28.60	4.11	32.06	4.68	35.53	5.28
	14.0	18.07	2.56	21.54	3.07	25.00	3.61	26.80	3.89	28.60	4.18	32.06	4.77	35.53	5.38
	16.0	18.07	2.60	21.54	3.12	25.00	3.68	26.80	3.96	28.60	4.26	32.06	4.87	35.53	5.48
	18.0	18.07	2.65	21.54	3.18	25.00	3.76	26.80	4.05	28.60	4.34	32.06	4.96	35.53	5.59
	20.0	18.07	2.70	21.54	3.24	25.00	3.83	26.80	4 .12	28.60	4.43	32.06	5.15	35.53	5.98
	21.0	18.07	2.72	21.54	3.27	25.00	3.87	26.80	4.17	28.60	4.53	32.06	5.33	35.53	6.20
	23.0	18.07	2.77	21.54	3.34	25.00	4.05	26.80	4.44	28.60	4.84	32.06	5.71	35.53	6.65
	25.0	18.07	2.85	21.54	3.55	25.00	4.33	26.80	4.74	28.60	5.17	32.06	6.11	35.53	7.11
	27.0	18.07	3.04	21.54	3.78	25.00	4.61	26.80	5.06	28.60	5.53	32.06	6.53	35.53	7.61
	29.0	18.07	3.23	21.54	4.03	25.00	4.92	26.80	5.39	28.60	5.90	32.06	6.96	35.53	8.14
	31.0	18.07	3.43	21.54	4.28	25.00	5.23	26.80	5.74	28.60	6.29	32.06	7.44	34.94	8.45
	33.0	18.07	3.65	21.54	4.55	25.00	5.57	26.80	6.12	28.60	6.70	32.06	7.93	34.46	8.77
	35.0	18.07	3.87	21.54	4.84	25.00	5.93	26.80	6.51	28.60	7.14	32.06	8.45	33.86	9.09
	37.0	18.07	4.10	21.54	5.13	25.00	6.31	26.80	6.94	28.60	7.60	32.06	9.01	33.38	9.40
	39.0	18.07	4.34	21.54	5.48	25.00	6.71	26.80	7.38	28.60	8.09	32.06	9.60	32.78	9.73
	42.0	18.07	4.47	21.54	5.54	25.00	6.84	26.80	7.64	28.60	8.28	32.06	9.92	32.51	9.96
	44.0	18.07	4.67	21.54	5.61	25.00	6.97	26.80	7.77	28.60	8.41	32.06	9.99	32.25	10.06
	46.0	18.07	4.73	21.54	5.67	25.00	7.11	26.80	7.97	28.60	8.57	32.06	10.14	31.98	10.29

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
70%	10.0	15.79	2.18	18.90	2.59	21.90	3.01	23.45	3.24	25.00	3.48	28.00	3.95	31.11	4.44
	12.0	15.79	2.21	18.90	2.62	21.90	3.07	23.45	3.31	25.00	3.54	28.00	4.02	31.11	4.53
	14.0	15.79	2.24	18.90	2.67	21.90	3.12	23.45	3.35	25.00	3.60	28.00	4.10	31.11	4.61
	16.0	15.79	2.28	18.90	2.72	21.90	3.18	23.45	3.43	25.00	3.67	28.00	4.17	31.11	4.70
	18.0	15.79	2.32	18.90	2.77	21.90	3.24	23.45	3.49	25.00	3.73	28.00	4.26	31.11	4.79
	20.0	15.79	2.35	18.90	2.82	21.90	3.31	23.45	3.55	25.00	3.81	28.00	4.34	31.11	4.93
	21.0	15.79	2.38	18.90	2.84	21.90	3.33	23.45	3.59	25.00	3.84	28.00	4.40	31.11	5.10
	23.0	15.79	2.41	18.90	2.89	21.90	3.40	23.45	3.71	25.00	4.04	28.00	4.72	31.11	5.46
	25.0	15.79	2.46	18.90	3.01	21.90	3.62	23.45	3.96	25.00	4.31	28.00	5.05	31.11	5.84
	27.0	15.79	2.61	18.90	3.21	21.90	3.87	23.45	4.22	25.00	4.60	28.00	5.39	31.11	6.25
	29.0	15.79	2.77	18.90	3.40	21.90	4.11	23.45	4.50	25.00	4.89	28.00	5.74	31.11	6.67
	31.0	15.79	2.93	18.90	3.61	21.90	4.38	23.45	4.78	25.00	5.21	28.00	6.12	31.11	7.11
	33.0	15.79	3 .11	18.90	3.84	21.90	4.66	23.45	5.09	25.00	5.55	28.00	6.53	31.11	7.59
	35.0	15.79	3.29	18.90	4.07	21.90	4.94	23.45	5.42	25.00	5.90	28.00	6.95	31.11	8.09
	37.0	15.79	3.48	18.90	4.32	21.90	5.26	23.45	5.74	25.00	6.28	28.00	7.40	31.11	8.61
	39.0	15.79	3.68	18.90	4.57	21.90	5.57	23.45	6.11	25.00	6.67	28.00	7.87	31.11	9.17
	42.0	15.79	3.90	18.90	4.79	21.90	5.79	23.45	6.38	25.00	6.94	28.00	8.30	31.11	9.71
	44.0	15.79	4.16	18.90	5.06	21.90	5.97	23.45	6.65	25.00	7.21	28.00	8.68	31.11	10.04
	46.0	15.79	4.34	18.90	5.28	21.90	6.22	23.45	6.87	25.00	7.43	28.00	8.95	31.11	10.26
60%	10.0	13.52	1.89	16.15	2.22	18.78	2.57	20.10	2.76	21.42	2.94	24.05	3.33	26.68	3.73
	12.0	13.52	1.93	16.15	2.26	18.78	2.62	20.10	2.81	21.42	2.99	24.05	3.39	26.68	3.79
	14.0	13.52	1.95	16.15	2.29	18.78	2.66	20.10	2.85	21.42	3.05	24.05	3.45	26.68	3.87
	16.0	13.52	1.98	16.15	2.33	18.78	2.71	20.10	2.90	21.42	3.10	24.05	3.51	26.68	3.94
	18.0	13.52	2.01	16.15	2.37	18.78	2.76	20.10	2.95	21.42	3.16	24.05	3.57	26.68	4.01
	20.0	13.52	2.04	16.15	2.41	18.78	2.81	20.10	3.01	21.42	3.22	24.05	3.65	26.68	4.10
	21.0	13.52	2.06	16.15	2.43	18.78	2.83	20.10	3.04	21.42	3.24	24.05	3.68	26.68	4.13
	23.0	13.52	2.09	16.15	2.48	18.78	2.88	20.10	3.10	21.42	3.30	24.05	3.83	26.68	4.40
	25.0	13.52	2.12	16.15	2.51	18.78	2.99	20.10	3.24	21.42	3.51	24.05	4.09	26.68	4.69
	27.0	13.52	2.21	16.15	2.67	18.78	3.18	20.10	3.46	21.42	3.74	24.05	4.35	26.68	5.01
	29.0	13.52	2.33	16.15	2.83	18.78	3.39	20.10	3.68	21.42	3.99	24.05	4.65	26.68	5.35
	31.0	13.52	2.48	16.15	3.00	18.78	3.60	20.10	3.91	21.42	4.24	24.05	4.94	26.68	5.69
	33.0	13.52	2.61	16.15	3.18	18.78	3.82	20.10	4.16	21.42	4.51	24.05	5.26	26.68	6.07
	35.0	13.52	2.77	16.15	3.38	18.78	4.05	20.10	4.41	21.42	4.79	24.05	5.60	26.68	6.46
	37.0	13.52	2.93	16.15	3.57	18.78	4.29	20.10	4.68	21.42	5.09	24.05	5.95	26.68	6.88
	39.0	13.52	3.09	16.15	3.78	18.78	4.55	20.10	4.96	21.42	5.40	24.05	6.32	26.68	7.32
	42.0	13.52	3.22	16.15	4.00	18.78	4.77	20.10	5.23	21.42	5.67	24.05	6.71	26.68	7.76
	44.0	13.52	3.35	16.15	4.22	18.78	4.99	20.10	5.40	21.42	5.93	24.05	7.08	26.68	8.20
	46.0	13.52	3.53	16.15	4.41	18.78	5.17	20.10	5.63	21.42	6.24	24.05	7.33	26.68	8.64

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
50%	10.0	11.31	1.63	13.52	1.89	15.67	2.16	16.75	2.31	17.83	2.44	19.98	2.74	22.25	3.06
	12.0	11.31	1.65	13.52	1.91	15.67	2.20	16.75	2.33	17.83	2.49	19.98	2.79	22.25	3.11
	14.0	11.31	1.67	13.52	1.94	15.67	2.22	16.75	2.38	17.83	2.52	19.98	2.84	22.25	3.17
	16.0	11.31	1.70	13.52	1.96	15.67	2.26	16.75	2.41	17.83	2.56	19.98	2.89	22.25	3.22
	18.0	11.31	1.72	13.52	2.00	15.67	2.29	16.75	2.45	17.83	2.61	19.98	2.94	22.25	3.28
	20.0	11.31	1.74	13.52	2.02	15.67	2.33	16.75	2.49	17.83	2.66	19.98	2.99	22.25	3.34
	21.0	11.31	1.76	13.52	2.05	15.67	2.35	16.75	2.51	17.83	2.68	19.98	3.02	22.25	3.38
	23.0	11.31	1.78	13.52	2.07	15.67	2.39	16.75	2.56	17.83	2.73	19.98	3.07	22.25	3.45
	25.0	11.31	1.80	13.52	2.11	15.67	2.44	16.75	2.61	17.83	2.82	19.98	3.23	22.25	3.68
	27.0	11.31	1.84	13.52	2.20	15.67	2.57	16.75	2.78	17.83	2.99	19.98	3.44	22.25	3.93
	29.0	11.31	1.94	13.52	2.32	15.67	2.73	16.75	2.95	17.83	3.18	19.98	3.66	22.25	4.18
	31.0	11.31	2.05	13.52	2.45	15.67	2.89	16.75	3.13	17.83	3.38	19.98	3.89	22.25	4.45
	33.0	11.31	2.17	13.52	2.60	15.67	3.07	16.75	3.32	17.83	3.59	19.98	4.13	22.25	4.73
	35.0	11.31	2.29	13.52	2.74	15.67	3.24	16.75	3.51	17.83	3.79	19.98	4.39	22.25	5.02
	37.0	11.31	2.41	13.52	2.90	15.67	3.44	16.75	3.72	17.83	4.02	19.98	4.66	22.25	5.34
	39.0	11.31	2.55	13.52	3.06	15.67	3.63	16.75	3.94	17.83	4.27	19.98	4.94	22.25	5.67
	42.0	11.31	2.69	13.52	3.24	15.67	3.81	16.75	4.18	17.83	4.51	19.98	5.29	22.25	6.02
	44.0	11.31	2.83	13.52	3.41	15.67	3.99	16.75	4.43	17.83	4.62	19.98	5.64	22.25	6.37
	46.0	11.31	2.96	13.52	3.59	15.67	4.16	16.75	4.64	17.83	4.76	19.98	5.99	22.25	6.72

Note:

- *is shown as reference.*
- *In cooling mode, avoid the outdoor air temperature range from 42-46°C, when selecting the models.*
- *The above talbe shows the average value of conditions may operate.*
- *It is recommended to use capacity index less than 130%.*

Heating Mode: 4TVH0115

Table 13

TC: Total Capacity (kW) **WB:** Wet-bulb Temperature **DB:** Dry-bulb Temperature **PI:** Power Input (kW)

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
130%	-19.8	-20	24.28	6.35	24.16	6.80	24.05	7.25	24.05	7.47	23.93	7.69	23.93	8.15
	-18.8	-19	24.64	6.49	24.52	6.94	24.52	7.38	24.40	7.60	24.40	7.81	24.28	8.25
	-16.7	-17	25.59	6.80	25.47	7.22	25.35	7.65	25.35	7.86	25.35	8.07	25.24	8.49
	-13.7	-15	26.66	7.11	26.55	7.52	26.43	7.93	26.43	8.13	26.31	8.34	26.31	8.75
	-11 .8	-13	27.74	7.43	27.74	7.82	27.62	8.21	27.50	8.41	27.50	8.60	27.38	8.99
	-9.8	-11	29.05	7.75	28.93	8.13	28.81	8.50	28.81	8.69	28.81	8.87	28.69	9.25
	-9.5	-10	29.76	7.92	29.64	8.28	29.52	8.64	29.52	8.83	29.40	9.00	29.40	9.36
	-8.5	-9.1	30.35	8.06	30.24	8.41	30.24	8.77	30.12	8.94	30.12	9.12	30.00	9.48
	-7	-7.6	31.43	8.29	31.43	8.64	31.31	8.98	31.31	9.15	31 .19	9.32	31.07	9.67
	-5	-5.6	33.09	8.60	32.97	8.93	32.85	9.26	32.85	9.42	32.74	9.57	32.74	9.90
	-3	-3.7	34.64	8.88	34.52	9.20	34.52	9.50	34.40	9.67	34.40	9.82	34.28	10.12
	0	-0.7	37.38	9.32	37.38	9.61	37.26	9.89	37.26	9.99	37.14	10.18	37.14	10.46
	3	2.2	40.35	9.70	40.24	9.97	40.12	10.24	40.12	10.37	40.12	10.51	40.00	10.76
	5	4.1	42.38	9.95	42.26	10.20	42.26	10.45	42.14	10.58	42.14	10.71	42.02	10.95
	7	6	44.52	10.18	44.40	10.41	44.40	10.66	44.28	10.78	44.28	10.89	42.50	10.46
	9	7.9	46.78	10.39	46.66	10.62	46.66	10.85	46.55	10.96	45.59	10.73	42.50	9.83
	11	9.8	49.16	10.60	49.05	10.81	48.81	10.95	47.14	10.52	45.59	10.09	42.50	9.26
	13	11.8	51.78	10.80	51.66	11.01	48.81	10.26	47.14	9.85	45.59	9.47	42.50	8.69
	15	13.7	54.28	10.99	51.90	10.43	48.81	9.67	47.14	9.29	45.59	8.92	42.50	8.20
120%	-19.8	-20	24.17	6.96	24.05	7.37	23.93	7.79	23.93	7.99	23.93	8.20	23.81	8.62
	-18.8	-19	24.53	7.09	24.41	7.50	24.41	7.90	24.29	8.10	24.29	8.31	24.17	8.72
	-16.7	-17	25.48	7.37	25.36	7.76	25.20	8.15	25.24	8.35	25.24	8.55	25.12	8.93
	-13.7	-15	26.55	7.66	26.43	8.03	26.31	8.41	26.31	8.61	26.31	8.79	26.19	9.17
	-11 .8	-13	27.62	7.95	27.62	8.31	27.50	8.68	27.50	8.86	27.38	9.04	27.38	9.40
	-9.8	-11	28.93	8.25	28.81	8.59	28.81	8.94	28.69	9.12	28.69	9.28	28.57	9.63
	-9.5	-10	29.65	8.41	29.53	8.75	29.41	9.07	29.41	9.25	29.41	9.41	29.29	9.75
	-8.5	-9.1	30.24	8.53	30.12	8.86	30.12	9.19	30.00	9.35	30.00	9.53	29.88	9.85
	-7	-7.6	31.31	8.76	31.31	9.07	31.19	9.39	31.19	9.55	31.07	9.70	31.07	10.02
	-5	-5.6	32.98	9.04	32.86	9.34	32.74	9.64	32.74	9.80	32.74	9.95	32.62	10.24
	-3	-3.7	34.53	9.31	34.53	9.60	34.41	9.88	34.41	10.02	34.29	10.17	34.29	10.45
	0	-0.7	37.26	9.70	37.26	9.97	37.14	10.23	37.14	10.37	37.02	10.50	37.02	10.76
	3	2.2	40.24	10.06	40.12	10.31	40.12	10.55	40.00	10.68	40.00	10.80	39.17	10.74
	5	4.1	42.26	10.29	42.14	10.52	42.14	10.75	42.02	10.87	42.02	10.99	39.17	10.09
	7	6	44.41	10.50	44.41	10.72	44.29	10.94	43.57	10.79	42.14	10.34	39.17	9.49
	9	7.9	46.67	10.71	46.55	10.92	45.00	10.55	43.57	10.14	42.14	9.73	39.17	8.93
	11	9.8	49.05	10.89	47.86	10.71	45.00	9.92	43.57	9.54	42.14	9.15	39.17	8.42
	13	11.8	50.83	10.79	47.86	10.04	45.00	9.31	43.57	8.96	42.14	8.61	39.17	7.92
	15	13.7	50.83	10.16	47.86	9.46	45.00	8.78	43.57	8.44	42.14	8.11	39.17	7.47

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
110%	-19.8	-20	24.05	7.57	23.93	7.94	23.81	8.32	23.81	8.51	23.82	8.70	23.69	9.08
	-18.8	-19	24.41	7.68	24.29	8.06	24.29	8.43	24.29	8.62	24.17	8.80	24.17	9.18
	-16.7	-17	25.36	7.94	25.24	8.30	25.59	8.66	25.12	8.84	25.12	9.03	25.00	9.38
	-13.7	-15	26.43	8.21	26.31	8.56	26.19	8.90	26.19	9.07	26.19	9.25	26.07	9.59
	-11 .8	-13	27.50	8.49	27.50	8.81	27.38	9.14	27.38	9.31	27.26	9.47	27.26	9.81
	-9.8	-11	28.81	8.76	28.69	9.07	28.69	9.39	28.57	9.55	28.57	9.70	28.57	10.02
	-9.5	-10	29.52	8.90	29.40	9.20	29.28	9.52	29.28	9.67	29.28	9.82	29.17	10.12
	-8.5	-9.1	30.12	9.01	30.00	9.32	30.00	9.62	29.88	9.77	29.88	9.92	29.88	9.05
	-7	-7.6	31.19	9.22	31.19	9.50	31.07	9.80	31.07	9.95	31.07	10.09	30.95	10.38
	-5	-5.6	32.86	9.48	32.74	9.76	32.62	10.03	32.62	10.17	32.62	10.31	32.50	10.59
	-3	-3.7	34.41	9.73	34.41	9.98	34.29	10.25	34.29	10.38	34.17	10.51	34.17	10.78
	0	-0.7	37.14	10.09	37.14	10.33	37.03	10.58	37.03	10.69	37.03	10.82	35.95	10.61
	3	2.2	40.12	10.43	40.00	10.65	40.00	10.87	39.88	10.98	38.57	10.53	35.95	9.66
	5	4.1	42.14	10.62	42.14	10.85	41.31	10.74	39.88	10.31	38.57	9.90	35.95	9.08
	7	6	44.28	10.82	43.93	10.89	41.31	10.09	39.88	9.69	38.57	9.31	35.95	8.55
	9	7.9	46.55	11.00	43.93	10.24	41.31	9.49	39.88	9.12	38.57	8.76	35.95	8.06
	11	9.8	46.55	10.34	43.93	9.63	41.31	8.93	39.88	8.59	38.57	8.25	35.95	7.60
	13	11.8	46.55	9.70	43.93	9.04	41.31	8.39	39.88	8.08	38.57	7.76	35.95	7.16
	15	13.7	46.55	8.62	43.93	8.52	41.31	7.93	39.88	7.62	38.57	7.34	35.95	6.77
100%	-19.8	-20	23.93	8.17	23.81	8.51	23.81	8.86	23.69	9.04	23.69	9.20	23.57	9.55
	-18.8	-19	24.29	8.28	24.29	8.62	24.17	8.95	24.17	9.13	24.05	9.31	24.05	9.64
	-16.7	-17	25.24	8.51	25.12	8.84	25.12	9.17	25.00	9.33	25.00	9.49	25.00	9.82
	-13.7	-15	26.31	8.76	26.19	9.07	26.07	9.39	26.07	9.55	26.07	9.70	25.95	10.02
	-11 .8	-13	27.38	9.01	27.38	9.31	27.26	9.61	27.26	9.76	27.26	9.91	27.14	10.22
	-9.8	-11	28.69	9.26	28.57	9.55	28.57	9.83	28.57	9.98	28.45	10.12	28.45	10.40
	-9.5	-10	29.40	9.39	29.29	9.67	29.29	9.95	29.17	10.09	29.17	10.23	29.05	10.51
	-8.5	-9.1	30.00	9.49	29.88	9.77	29.88	10.04	29.88	10.18	29.76	10.32	29.76	10.59
	-7	-7.6	31.07	9.68	31.07	9.95	30.95	10.20	30.95	10.34	30.95	10.47	30.83	10.74
	-5	-5.6	32.74	9.92	32.62	10.17	32.62	10.43	32.50	10.54	32.50	10.67	32.38	10.93
	-3	-3.7	34.29	10.15	34.29	9.21	34.17	10.62	34.17	10.74	34.17	10.86	32.74	10.40
	0	-0.7	37.02	10.47	37.02	10.69	36.90	10.92	36.31	10.74	35.12	10.30	32.74	9.44
	3	2.2	40.00	10.78	39.88	10.97	37.50	10.16	36.31	9.76	35.12	9.38	32.74	8.60
	5	4.1	42.02	10.97	39.88	10.31	37.50	9.55	36.31	9.19	35.12	8.83	32.74	8 .11
	7	6	42.26	10.41	39.88	9.69	37.50	8.99	36.31	8.65	35.12	8.31	32.74	7.65
	9	7.9	42.26	9.78	39.88	9.12	37.50	8.46	36.31	8.04	35.12	7.83	32.74	7.22
	11	9.8	42.26	9.21	39.88	8.59	37.50	7.99	36.31	7.68	35.12	7.39	32.74	6.82
	13	11.8	42.26	8.65	39.88	8.08	37.50	7.52	36.31	7.24	35.12	6.97	32.74	6.43
	15	13.7	42.26	8.16	39.88	7.62	37.50	7.10	36.31	6.84	35.12	6.59	32.74	6.09

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
90%	-19.8	-20	23.77	8.78	23.65	9.08	23.65	9.40	23.53	9.55	23.53	9.71	23.53	10.02
	-18.8	-19	24.12	8.87	24.12	9.19	24.01	9.49	24.01	9.64	24.01	9.80	23.88	10.10
	-16.7	-17	25.08	9.09	24.95	9.39	24.95	9.68	24.95	9.83	24.84	9.97	24.84	10.26
	-13.7	-15	26.14	9.32	26.02	9.60	26.02	9.88	25.91	10.02	25.91	0.16	25.91	10.44
	-11 .8	-13	27.21	9.54	27.21	9.81	27.09	10.08	27.09	10.22	27.09	0.34	26.98	10.61
	-9.8	-11	28.52	9.76	28.52	10.02	28.40	10.27	28.40	10.40	28.40	0.54	28.28	10.80
	-9.5	-10	29.23	9.88	29.12	10.13	29.12	10.38	29.00	10.51	29.00	0.64	29.00	10.88
	-8.5	-9.1	29.83	9.98	29.83	10.23	29.71	10.47	29.71	10.59	29.71	0.72	29.35	10.82
	-7	-7.6	30.90	10.15	30.90	10.38	30.78	10.62	30.78	10.74	30.78	0.86	29.35	10.33
	-5	-5.6	32.56	10.37	32.44	10.59	32.44	10.81	32.32	10.93	31.49	0.59	29.35	9.71
	-3	-3.7	34.11	10.57	34 .11	10.78	33.75	10.82	32.56	10.39	31.49	9.97	29.35	9.15
	0	-0.7	36.96	10.87	35.89	10.60	33.75	9.82	32.56	9.43	31.49	9.06	29.35	8.32
	3	2.2	38.03	10.36	35.89	9.64	33.75	8.94	32.56	8.60	31.49	8.27	29.35	7.61
	5	4.1	38.03	9.74	35.89	9.07	33.75	8.43	32.56	8.10	31.49	7.80	29.35	7.18
	7	6	38.03	9.15	35.89	8.55	33.75	7.94	32.56	7.65	31.49	7.36	29.35	6.78
	9	7.9	38.03	8.63	35.89	8.04	33.75	7.48	32.56	7.22	31.49	6.95	29.35	6.41
	11	9.8	38.03	8.13	35.89	7.59	33.75	7.08	32.56	6.82	31.49	6.56	29.35	6.07
	13	11.8	38.03	7.65	35.89	7.16	33.75	6.67	32.56	6.43	31.49	6.20	29.35	5.73
	15	13.7	38.03	7.23	35.89	6.76	33.75	6.32	32.56	6.09	31.49	5.87	29.35	5.44
80%	-19.8	-20	23.69	9.39	23.57	9.66	23.57	9.94	23.57	10.08	23.45	0.22	23.45	10.48
	-18.8	-19	24.05	9.47	24.05	9.75	23.93	10.02	23.93	10.16	23.93	0.29	23.81	10.57
	-16.7	-17	25.00	9.67	24.88	9.92	24.88	10 .19	24.88	10.32	24.88	0.45	24.76	10.71
	-13.7	-15	26.07	9.87	25.95	10.11	25.95	10.37	25.95	10.48	25.83	0.61	25.83	10.87
	-11 .8	-13	27.14	10.06	27.14	10.31	27.02	10.54	27.02	10.66	27.02	0.79	26.19	10.50
	-9.8	-11	28.45	10.26	28.45	10.50	28.33	10.73	28.33	10.83	28.10	0.81	26.19	9.91
	-9.5	-10	29.17	10.37	29.04	10.59	29.05	10.81	29.05	10.93	28.10	0.50	26.19	9.62
	-8.5	-9.1	29.76	10.46	27.66	10.68	29.64	10.89	29.05	10.65	28.10	0.22	26.19	9.36
	-7	-7.6	30.83	10.61	30.83	10.82	30.00	10.59	29.05	10.17	28.10	9.76	26.19	8.95
	-5	-5.6	32.50	10.80	31.91	10.74	30.00	9.95	29.05	9.56	28.10	9.18	26.19	8.43
	-3	-3.7	33.81	10.86	31.91	10.11	30.00	9.36	29.05	9.01	28.10	8.65	26.19	7.96
	0	-0.7	33.81	9.85	31.91	9.18	30.00	8.52	29.05	8.21	28.10	7.88	26.19	7.26
	3	2.2	33.81	8.98	31.91	8.37	30.00	7.79	29.05	7.50	28.10	7.22	26.19	6.65
	5	4.1	33.81	8.45	31.91	7.89	30.00	7.34	29.05	7.07	28.10	6.82	26.19	6.29
	7	6	33.81	7.96	31.91	7.45	30.00	6.93	29.05	6.69	28.10	6.44	26.19	5.95
	9	7.9	33.81	7.52	31.91	7.03	30.00	6.55	29.05	6.32	28.10	6.09	26.19	5.64
	11	9.8	33.81	7.10	31.91	6.64	30.00	6.20	29.05	5.98	28.10	5.77	26.19	5.35
	13	11.8	33.81	6.69	31.91	6.27	30.00	5.86	29.05	5.65	28.10	5.45	26.19	5.06
	15	13.7	33.81	6.33	31.91	5.94	30.00	5.56	29.05	5.36	28.10	5.17	26.19	4.81

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
70%	-19.8	-20	23.52	9.99	23.40	10.23	23.40	10.47	23.40	10.59	23.40	10.72	22.81	10.60
	-18.8	-19	23.87	10.07	23.87	10.31	23.76	10.54	23.76	10.66	23.76	10.79	22.81	10.38
	-16.7	-17	24.82	10.24	24.82	10.47	24.71	10.69	24.71	10.81	24.47	9.63	22.81	9.90
	-13.7	-15	25.89	10.41	25.77	10.64	25.77	10.86	25.30	10.69	24.47	10.26	22.81	9.41
	-11 .8	-13	26.96	10.59	26.96	10.80	26.25	10.54	25.30	10.13	24.47	9.73	22.81	8.92
	-9.8	-11	28.27	10.76	27.91	10.75	26.25	9.96	25.30	9.57	24.47	9.19	22.81	8.44
	-9.5	-10	28.98	10.86	27.91	10.44	26.25	9.67	25.30	9.29	24.47	8.93	22.81	8.21
	-8.5	-9.1	29.58	10.92	27.91	10.16	26.25	9.41	25.30	9.05	24.47	8.70	22.81	8.00
	-7	-7.6	29.58	10.43	27.91	9.70	26.25	9.00	25.30	8.66	24.47	8.32	22.81	7.66
	-5	-5.6	29.58	9.80	27.91	9.13	26.25	8.48	25.30	8.15	24.47	9.63	22.81	7.23
	-3	-3.7	29.58	9.22	27.91	8.60	26.25	8.00	25.30	7.69	24.47	7.40	22.81	6.83
	0	-0.7	29.58	8.39	27.91	7.85	26.25	7.30	25.30	7.03	24.47	6.77	22.81	6.26
	3	2.2	29.58	7.67	27.91	7.18	26.25	6.69	25.30	6.44	24.47	6.21	22.81	5.74
	5	4.1	29.58	7.24	27.91	6.77	26.25	6.33	25.30	6.09	24.47	5.87	22.81	5.44
	7	6	29.58	6.84	27.91	6.41	26.25	5.98	25.30	5.77	24.47	5.57	22.81	5.16
	9	7.9	29.58	6.47	27.91	6.06	26.25	5.66	25.30	5.46	24.47	5.28	22.81	4.89
	11	9.8	29.58	6.12	27.91	5.73	26.25	5.37	25.30	5.18	24.47	5.01	22.81	4.65
	13	11.8	29.58	5.78	27.91	5.43	26.25	5.08	25.30	4.92	24.47	4.74	22.81	4.41
	15	13.7	29.58	5.48	27.91	5.15	26.25	4.82	25.30	4.67	24.47	4.51	22.81	4.20
60%	-19.8	-20	23.45	10.60	23.33	10.80	22.50	10.3c	21.79	9.98	21.07	9.58	19.64	8.79
	-18.8	-19	23.81	10.67	23.81	10.87	22.50	10.17	21.79	9.77	21.07	9.37	19.64	8.60
	-16.7	-17	24.76	10.81	23.93	10.47	22.50	9.70	21.79	9.33	21.07	8.95	19.64	8.23
	-13.7	-15	25.36	10.69	23.93	9.95	22.50	9.22	21.79	8.87	21.07	8.52	19.64	7.83
	-11 .8	-13	25.36	10.12	23.93	9.42	22.50	8.74	21.79	8.42	21.07	8.09	19.64	7.48
	-9.8	-11	25.36	9.56	23.93	8.91	22.50	8.28	21.79	7.96	21.07	7.66	19.64	7.06
	-9.5	-10	25.36	9.29	23.93	8.66	22.50	8.04	21.79	7.75	21.07	7.45	19.64	6.86
	-8.5	-9.1	25.36	9.05	23.93	8.44	22.50	7.85	21.79	7.55	21.07	7.26	19.64	6.70
	-7	-7.6	25.36	8.65	23.93	8.08	22.50	7.51	21.79	7.24	21.07	6.96	19.64	6.43
	-5	-5.6	25.36	8.15	23.93	7.61	22.50	7.09	21.79	6.83	21.07	6.57	19.64	6.08
	-3	-3.7	25.36	7.69	23.93	7.19	22.50	6.70	21.79	6.47	21.07	6.22	19.64	5.76
	0	-0.7	25.36	7.03	23.93	6.58	22.50	6.14	21.79	5.93	21.07	5.71	19.64	5.29
	3	2.2	25.36	6.44	23.93	6.05	22.50	5.65	21.79	5.45	21.07	5.27	19.64	4.88
	5	4.1	25.36	6.09	23.93	5.72	22.50	5.35	21.79	5.17	21.07	4.99	19.64	4.63
	7	6	25.36	5.77	23.93	5.42	22.50	5.07	21.79	4.90	21.07	4.74	19.64	4.40
	9	7.9	25.36	5.46	23.93	5.14	22.50	4.81	21.79	4.66	21.07	4.49	19.64	4.19
	11	9.8	25.36	5.18	23.93	4.88	22.50	4.58	21.79	4.42	21.07	4.27	19.64	3.99
	13	11.8	25.36	4.90	23.93	4.62	22.50	4.34	21.79	4.20	21.07	4.06	19.64	3.79
	15	13.7	25.36	4.67	23.93	4.39	22.50	4.13	21.79	4.00	21.07	3.88	19.64	

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
50%	-19.8	-20	21 .12	9.64	19.94	8.98	18.75	8.34	18.04	8.03	17.45	7.72	16.26	7 .11
	-18.8	-19	21 .12	9.43	19.94	8.79	18.75	8.17	18.04	7.86	17.45	7.55	16.26	6.97
	-16.7	-17	21 .12	9.00	19.94	8.39	18.75	7.81	18.04	7.52	17.45	7.24	16.26	6.68
	-13.7	-15	21 .12	8.57	19.94	8.00	18.75	7.44	18.04	7.17	17.45	6.90	16.26	6.37
	-11 .8	-13	21 .12	8.14	19.94	7.60	18.75	7.07	18.04	6.82	17.45	6.56	16.26	6.07
	-9.8	-11	21 .12	7.71	19.94	7.20	18.75	6.71	18.04	6.47	17.45	6.23	16.26	5.77
	-9.5	-10	21 .12	7.50	19.94	7.00	18.75	6.54	18.04	6.30	17.45	6.07	16.26	5.62
	-8.5	-9.1	21 .12	7.31	19.94	6.84	18.75	6.37	18.04	6.15	17.45	5.93	16.26	5.49
	-7	-7.6	21 .12	7.00	19.94	6.56	18.75	6.12	18.04	5.91	17.45	5.70	16.26	5.28
	-5	-5.6	21 .12	6.61	19.94	6.20	18.75	5.79	18.04	5.59	17.45	5.39	16.26	5.00
	-3	-3.7	21 .12	6.26	19.94	5.87	18.75	5.49	18.04	5.30	17.45	5 .11	16.26	4.75
	0	-0.7	21 .12	5.74	19.94	5.39	18.75	5.05	18.04	4.88	17.45	4.72	16.26	4.39
	3	2.2	21 .12	5.29	19.94	4.97	18.75	4.66	18.04	4.51	17.45	4.35	16.26	4.06
	5	4.1	21 .12	5.02	19.94	4.72	18.75	4.42	18.04	4.28	17.45	4.14	16.26	3.86
	7	6	21 .12	4.76	19.94	4.48	18.75	4.21	18.04	4.07	17.45	3.95	16.26	3.69
	9	7.9	21 .12	4.52	19.94	4.26	18.75	4.00	18.04	3.89	17.45	3.76	16.26	3.51
	11	9.8	21 .12	4.30	19.94	4.05	18.75	3.82	18.04	3.70	17.45	3.58	16.26	3.35
	13	11.8	21 .12	4.09	19.94	3.85	18.75	3.63	18.04	3.53	17.45	3.41	16.26	3.20
	15	13.7	21 .12	3.89	19.94	3.68	18.75	3.47	18.04	3.36	17.45	3.26	16.26	3.06

Note:

- *is shown as reference.*
- *In heating mode, avoid the outdoor air temperature range from -15–20 °C, when selecting the models.*
- *The above talbe shows the average value of conditions may operate.*
- *It is recommended to use capacity index less than 130%.*

Cooling Mode: 4TVH0135

Table 14

TC: Total Capacity (kW) **WB:** Wet-bulb Temperature **DB:** Dry-bulb Temperature **PI:** Power Input (kW)

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
130%	10.0	35.14	5.67	41.86	6.94	48.57	8.25	50.43	8.43	51.00	8.26	52.28	7.91	53.57	7.55
	12.0	35.14	5.77	41.86	7.07	48.57	8.41	49.71	8.38	50.43	8.21	51.57	7.85	52.86	7.73
	14.0	35.14	5.89	41.86	7.20	48.43	8.51	49.14	8.41	49.71	8.16	51.00	8.10	52.28	8.18
	16.0	35.14	5.99	41.86	7.35	47.86	8.48	48.43	8.35	49.00	8.45	50.28	8.53	51.57	8.61
	18.0	35.14	6 .11	41.86	7.50	47.14	8.79	47.71	8.84	48.43	8.89	49.71	8.98	51.00	9.06
	20.0	35.14	6.24	41.86	7.98	46.43	9.23	47.14	9.27	47.71	9.32	49.00	9.41	50.28	9.51
	21.0	35.14	6.40	41.86	8.26	46.14	9.44	46.85	9.49	47.43	9.54	48.71	9.64	50.00	9.72
	23.0	35.14	6.87	41.86	8.86	45.57	9.87	46.14	9.92	46.71	9.97	48.00	10.07	49.28	10.17
	25.0	35.14	7.33	41.86	9.49	44.85	10.30	45.43	10.35	46.14	10.42	47.43	10.52	48.71	10.62
	27.0	35.14	7.83	41.86	10.15	44.28	10.73	44.85	10.80	45.43	10.85	46.71	10.97	48.00	11.08
	29.0	35.14	8.36	41.86	10.85	43.57	11.17	44.14	11.23	44.85	11.30	46.14	11.42	47.43	11.53
	31.0	35.14	8.93	41.71	11.48	42.85	11.61	43.57	11.68	44.14	11.73	45.43	11.86	46.71	12.00
	33.0	35.14	9.51	41.00	11.91	42.28	12.04	42.85	12.11	43.57	12.18	44.85	12.31	46.00	12.44
	35.0	35.14	10.14	40.28	12.34	41.57	12.49	42.28	12.56	42.85	12.63	44.14	12.78	45.43	12.91
	37.0	35.14	10.79	39.71	12.79	41.00	12.94	41.57	13.01	42.28	13.09	43.43	13.24	44.71	13.39
	39.0	35.14	11.48	39.00	12.93	40.28	13.37	41.00	13.46	41.57	13.54	42.85	13.69	44.14	13.85
	42.0	35.14	12.08	38.60	13.05	39.86	13.50	40.58	13.58	41.15	13.66	42.43	13.72	42.45	13.98
	44.0	35.14	12.70	38.19	13.18	39.44	13.57	40.15	13.71	40.30	13.70	40.89	13.77	41.44	14.04
	46.0	35.14	13.31	38.03	13.30	39.02	13.75	39.73	13.76	39.96	13.79	40.17	13.82	40.80	14.51
120%	10.0	32.43	5.18	38.57	6.32	44.86	7.52	48.00	8.13	50.29	8.48	51.43	8.15	52.57	7.83
	12.0	32.43	5.28	38.57	6.44	44.86	7.66	48.00	8.28	49.57	8.43	50.71	8.11	51.86	7.78
	14.0	32.43	5.38	38.57	6.57	44.86	7.81	48.00	8.45	48.86	8.38	50.14	8.06	51.28	8 .11
	16.0	32.43	5.47	38.57	6.70	44.86	7.96	47.71	8.51	48.28	8.40	49.43	8.48	50.57	8.54
	18.0	32.43	5.57	38.57	6.84	44.86	8.23	47.00	8.79	47.57	8.83	48.72	8.91	50.00	8.99
	20.0	32.43	5.69	38.57	7.10	44.86	8.86	46.43	9.22	47.00	9.26	48.14	9.34	49.29	9.42
	21.0	32.43	5.74	38.57	7.35	44.86	9.17	46.00	9.44	46.57	9.47	47.86	9.56	49.00	9.66
	23.0	32.43	6.14	38.57	7.88	44.86	9.82	45.43	9.85	46.00	9.90	47.14	10.00	48.28	10.09
	25.0	32.43	6.55	38.57	8.43	44.14	10.25	44.71	10.29	45.28	10.34	46.57	10.44	47.71	10.53
	27.0	32.43	7.00	38.57	9.01	43.57	10.67	44.14	10.73	44.71	10.78	45.86	10.88	47.00	10.98
	29.0	32.43	7.47	38.57	9.62	42.86	11.10	43.43	11.16	44.00	11.21	45.14	11.33	46.43	11.43
	31.0	32.43	7.96	38.57	10.27	42.14	11.55	42.86	11.60	43.43	11.66	44.57	11.78	45.71	11.90
	33.0	32.43	8.48	38.57	10.95	41.57	11.98	42.14	12.04	42.71	12.09	43.86	12.23	45.00	12.34
	35.0	32.43	9.03	38.57	11.68	40.86	12.41	41.43	12.48	42.14	12.54	43.28	12.68	44.43	12.81
	37.0	32.43	9.61	38.57	12.44	40.28	12.86	40.86	12.92	41.43	12.99	42.57	13.12	43.71	13.27
	39.0	32.43	10.22	38.43	13.14	39.57	13.29	40.14	13.37	40.72	13.44	42.00	13.59	43.14	13.72
	42.0	32.43	10.59	38.01	13.26	39.16	13.41	39.73	13.50	40.30	13.56	41.59	13.64	41.49	13.86
	44.0	32.43	10.72	37.81	13.39	38.74	13.51	39.32	13.54	39.89	13.60	40.34	13.69	41.02	14.34
	46.0	32.43	10.84	37.60	13.51	38.41	13.66	38.90	13.75	39.60	13.77	39.93	13.72	40.66	14.47

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
110%	10.0	29.71	4.69	35.43	35.43	41.14	6.80	44.00	7.35	46.86	7.91	50.43	8.40	51.57	8.11
	12.0	29.71	4.80	35.43	35.43	41.14	6.94	44.00	7.50	46.86	8.06	49.86	8.36	50.86	8.06
	14.0	29.71	4.88	35.43	35.43	41.14	7.07	44.00	7.63	46.86	8.21	49.14	8.31	50.29	8.05
	16.0	29.71	4.96	35.43	35.43	41.14	7.20	44.00	7.78	46.86	8.38	48.57	8.41	49.57	8.49
	18.0	29.71	5.06	35.43	35.43	41.14	7.35	44.00	8.00	46.86	8.78	47.86	8.84	49.00	8.93
	20.0	29.71	5.16	35.43	35.43	41.14	7.78	44.00	8.59	46.14	9.21	47.29	9.27	48.29	9.36
	21.0	29.71	5.21	35.43	35.43	41.14	8.06	44.00	8.91	45.86	9.42	46.86	9.49	48.00	9.57
	23.0	29.71	5.46	35.43	35.43	41.14	8.64	44.00	9.56	45.15	9.84	46.29	9.94	47.29	10.02
	25.0	29.71	5.82	35.43	35.43	41.14	9.24	44.00	10.24	44.57	10.27	45.57	10.37	46.71	10.45
	27.0	29.71	6.21	35.43	35.43	41.14	9.89	43.29	10.67	43.86	10.70	45.00	10.80	46.00	10.90
	29.0	29.71	6.62	35.43	35.43	41.14	10.57	42.72	11.10	43.29	11.15	44.29	11.25	45.43	11.35
	31.0	29.71	7.05	35.43	35.43	41.14	11.28	42.00	11.53	42.57	11.58	43.72	11.68	44.71	11.80
	33.0	29.71	7.50	35.43	35.43	40.86	11.90	41.43	11.96	42.00	12.01	43.00	12.13	44.14	12.24
	35.0	29.71	7.98	35.43	35.43	40.15	12.33	40.72	12.39	41.29	12.46	42.29	12.58	43.43	12.69
	37.0	29.71	8.49	35.43	35.43	39.57	12.78	40.15	12.83	40.57	12.89	41.72	13.02	42.72	13.14
	39.0	29.71	9.03	35.43	35.43	38.86	13.21	39.43	13.27	40.00	13.34	41.00	13.47	42.15	13.60
	42.0	29.71	9.15	35.43	35.43	38.45	13.33	39.02	13.40	39.60	13.46	40.31	13.60	40.45	13.73
	44.0	29.71	9.27	35.43	35.43	38.05	13.45	38.62	13.52	39.19	13.59	39.93	13.63	40.04	14.22
	46.0	29.71	9.51	35.43	35.43	37.68	13.58	38.21	13.72	38.89	13.71	39.49	14.34	39.70	14.38
100%	10.0	27.00	4.25	32.14	5.14	37.43	6.09	40.00	6.59	42.57	7.08	47.86	8.10	50.57	8.38
	12.0	27.00	4.31	32.14	5.24	37.43	6.20	40.00	6.70	42.57	7.22	47.86	8.25	49.86	8.33
	14.0	27.00	4.40	32.14	5.34	37.43	6.32	40.00	6.84	42.57	7.35	47.86	8.41	49.28	8.28
	16.0	27.00	4.48	32.14	5.44	37.43	6.45	40.00	6.97	42.57	7.50	47.57	8.51	48.57	8.43
	18.0	27.00	4.56	32.14	5.54	37.43	6.57	40.00	7.10	42.57	7.65	47.00	8.79	48.00	8.86
	20.0	27.00	4.65	32.14	5.66	37.43	6.77	40.00	7.46	42.57	8.20	46.28	9.21	47.28	9.29
	21.0	27.00	4.70	32.14	5.71	37.43	7.02	40.00	7.73	42.57	8.48	46.00	9.42	47.00	9.51
	23.0	27.00	4.81	32.14	6.09	37.43	7.52	40.00	8.28	42.57	9.09	45.43	9.85	46.28	9.94
	25.0	27.00	5.13	32.14	6.50	37.43	8.05	40.00	8.88	42.57	9.74	44.72	10.29	45.71	10.37
	27.0	27.00	5.47	32.14	6.93	37.43	8.59	40.00	9.49	42.57	10.42	44.00	10.72	45.00	10.82
	29.0	27.00	5.82	32.14	7.40	37.43	9.17	40.00	10.14	42.43	11.07	43.43	11.17	44.43	11.25
	31.0	27.00	6.20	32.14	7.90	37.43	9.79	40.00	10.82	41.86	11.50	42.72	11.60	43.71	11.70
	33.0	27.00	6.59	32.14	8.41	37.43	10.44	40.00	11.55	41.14	11.93	42.14	12.03	43.14	12.14
	35.0	27.00	7.00	32.14	8.94	37.43	11.13	40.00	12.31	40.43	12.36	41.43	12.47	42.43	12.58
	37.0	27.00	7.45	32.14	9.52	37.43	11.86	39.28	12.74	39.86	12.81	40.86	12.92	41.72	13.02
	39.0	27.00	7.91	32.14	10.12	37.43	12.63	38.71	13.17	39.14	13.24	40.14	13.36	41.14	13.49
	42.0	27.00	8.41	32.14	10.61	37.43	13.24	37.91	13.30	38.74	13.51	39.21	13.67	40.34	13.86
	44.0	27.00	8.90	32.14	11.10	37.43	13.42	37.11	13.54	38.38	13.63	40.14	13.85	39.31	13.98
	46.0	27.00	9.39	32.14	11.60	37.43	13.70	36.31	13.67	38.34	14.00	38.54	14.09	38.74	14.23

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
90%	10.0	24.29	3.80	29.00	4.58	33.71	5.41	36.00	5.84	38.29	6.27	43.00	7.17	47.71	8.08
	12.0	24.29	3.87	29.00	4.66	33.71	5.51	36.00	5.94	38.29	6.39	43.00	7.30	47.71	8.23
	14.0	24.29	3.93	29.00	4.74	33.71	5.61	36.00	6.06	38.29	6.50	43.00	7.43	47.71	8.38
	16.0	24.29	4.00	29.00	4.83	33.71	5.72	36.00	6.17	38.29	6.64	43.00	7.58	47.57	8.53
	18.0	24.29	4.06	29.00	4.93	33.71	5.82	36.00	6.29	38.29	6.77	43.00	7.73	47.00	8.79
	20.0	24.29	4.15	29.00	5.04	33.71	5.94	36.00	6.42	38.29	7.02	43.00	8.31	46.29	9.21
	21.0	24.29	4.18	29.00	5.08	33.71	6.04	36.00	6.64	38.29	7.27	43.00	8.61	46.00	9.42
	23.0	24.29	4.26	29.00	5.28	33.71	6.47	36.00	7.12	38.29	7.80	43.00	9.24	45.28	9.85
	25.0	24.29	4.50	29.00	5.64	33.71	6.92	36.00	7.61	38.29	8.33	43.00	9.89	44.72	10.29
	27.0	24.29	4.78	29.00	6.01	33.71	7.38	36.00	8.13	38.29	8.91	43.00	10.58	44.00	10.72
	29.0	24.29	5.09	29.00	6.40	33.71	7.88	36.00	8.68	38.29	9.52	42.57	11.07	43.43	11.15
	31.0	24.29	5.41	29.00	6.82	33.71	8.39	36.00	9.26	38.29	10.15	41.86	11.50	42.71	11.60
	33.0	24.29	5.74	29.00	7.25	33.71	8.96	36.00	9.87	38.29	10.83	41.28	11.94	42.14	12.03
	35.0	24.29	6.10	29.00	7.71	33.71	9.54	36.00	10.52	38.29	11.55	40.57	12.38	41.43	12.48
	37.0	24.29	6.47	29.00	8.20	33.71	10.15	36.00	11.20	38.29	12.31	39.86	12.81	40.86	12.91
	39.0	24.29	6.87	29.00	8.73	33.71	10.80	36.00	11.93	38.29	13.11	39.29	13.26	40.14	13.35
	42.0	24.29	7.18	29.00	9.25	33.71	11.33	36.00	12.35	38.29	13.21	38.92	13.70	39.78	13.77
	44.0	24.29	7.71	29.00	9.78	33.71	11.85	36.00	12.77	38.29	13.72	38.70	13.83	39.28	13.99
	46.0	24.29	8.13	29.00	10.21	33.71	12.27	36.00	13.19	38.29	13.96	38.49	13.99	38.57	14.15
80%	10.0	21.57	3.37	25.72	4.03	29.86	4.75	32.00	5.11	34.14	5.48	38.28	6.25	42.43	7.05
	12.0	21.57	3.42	25.72	4.10	29.86	4.83	32.00	5.21	34.14	5.59	38.28	6.37	42.43	7.18
	14.0	21.57	3.48	25.72	4.18	29.86	4.91	32.00	5.29	34.14	5.69	38.28	6.49	42.43	7.32
	16.0	21.57	3.53	25.72	4.25	29.86	5.01	32.00	5.39	34.14	5.79	38.28	6.62	42.43	7.45
	18.0	21.57	3.60	25.72	4.33	29.86	5 .11	32.00	5.51	34.14	5.91	38.28	6.75	42.43	7.60
	20.0	21.57	3.67	25.72	4.41	29.86	5.21	32.00	5.61	34.14	6.02	38.28	7.00	42.43	8.13
	21.0	21.57	3.70	25.72	4.45	29.86	5.26	32.00	5.67	34.14	6.16	38.28	7.25	42.43	8.43
	23.0	21.57	3.77	25.72	4.55	29.86	5.51	32.00	6.04	34.14	6.59	38.28	7.76	42.43	9.04
	25.0	21.57	3.88	25.72	4.83	29.86	5.89	32.00	6.45	34.14	7.03	38.28	8.31	42.43	9.67
	27.0	21.57	4.13	25.72	5.14	29.86	6.27	32.00	6.89	34.14	7.52	38.28	8.88	42.43	10.35
	29.0	21.57	4.40	25.72	5.48	29.86	6.69	32.00	7.33	34.14	8.03	38.28	9.47	42.43	11.07
	31.0	21.57	4.66	25.72	5.82	29.86	7.12	32.00	7.81	34.14	8.56	38.28	10.12	41.72	11.50
	33.0	21.57	4.96	25.72	6.19	29.86	7.58	32.00	8.33	34.14	9.11	38.28	10.78	41.14	11.93
	35.0	21.57	5.26	25.72	6.59	29.86	8.06	32.00	8.86	34.14	9.71	38.28	11.50	40.43	12.36
	37.0	21.57	5.57	25.72	6.98	29.86	8.58	32.00	9.44	34.14	10.34	38.28	12.26	39.86	12.79
	39.0	21.57	5.91	25.72	7.45	29.86	9.13	32.00	10.04	34.14	11.00	38.28	13.06	39.14	13.24
	42.0	21.57	6.08	25.72	7.54	29.86	9.30	32.00	10.39	34.14	11.27	38.28	13.50	38.82	13.55
	44.0	21.57	6.35	25.72	7.63	29.86	9.48	32.00	10.57	34.14	11.44	38.28	13.59	38.50	13.68
	46.0	21.57	6.44	25.72	7.71	29.86	9.67	32.00	10.84	34.14	11.66	38.28	13.80	38.18	14.00

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
70%	10.0	18.86	2.97	22.57	3.52	26.14	4.10	28.00	4.41	29.86	4.73	33.43	5.38	37.14	6.04
	12.0	18.86	3.00	22.57	3.57	26.14	4.18	28.00	4.50	29.86	4.81	33.43	5.47	37.14	6.16
	14.0	18.86	3.05	22.57	3.63	26.14	4.25	28.00	4.56	29.86	4.89	33.43	5.57	37.14	6.27
	16.0	18.86	3.10	22.57	3.70	26.14	4.33	28.00	4.66	29.86	4.99	33.43	5.67	37.14	6.39
	18.0	18.86	3.15	22.57	3.77	26.14	4.41	28.00	4.74	29.86	5.08	33.43	5.79	37.14	6.52
	20.0	18.86	3.20	22.57	3 83	26.14	4.50	28.00	4.83	29.86	5.18	33.43	5.91	37.14	6.70
	21.0	18.86	3.24	22.57	3.87	26.14	4.53	28.00	4.88	29.86	5.23	33.42	5.99	37.14	6.93
	23.0	18.86	3.28	22.57	3.93	26.14	4.63	28.00	5.04	29.86	5.49	33.42	6.42	37.14	7.43
	25.0	18.86	3.35	22.57	4.10	26.14	4.93	28.00	5.39	29.86	5.86	33.42	6.87	37.14	7.95
	27.0	18.86	3.55	22.57	4.36	26.14	5.26	28.00	5.74	29.86	6.25	33.42	7.33	37.14	8.49
	29.0	18.86	3.77	22.57	4.63	26.14	5.59	28.00	6.12	29.86	6.65	33.42	7.81	37.14	9.08
	31.0	18.86	3.98	22.57	4.91	26.14	5.96	28.00	6.50	29.86	7.08	33.42	8.33	37.14	9.67
	33.0	18.86	4.23	22.57	5.23	26.14	6.34	28.00	6.92	29.86	7.55	33.42	8.88	37.14	10.32
	35.0	18.86	4.48	22.57	5.54	26.14	6.72	28.00	7.37	29.86	8.03	33.43	9.46	37.14	11.00
	37.0	18.86	4.73	22.57	5.87	26.14	7.15	28.00	7.81	29.86	8.54	33.42	10.07	37.14	11.71
	39.0	18.86	5.01	22.57	6.22	26.14	7.58	28.00	8.31	29.86	9.08	33.42	10.70	37.14	12.48
	42.0	18.86	5.31	22.57	6.52	26.14	7.88	28.00	8.68	29.86	9.44	33.42	11.29	37.14	13.21
	44.0	18.86	5.66	22.57	6.88	26.14	8.12	28.00	9.05	29.86	9.81	33.42	11.81	37.14	13.65
	46.0	18.86	5.91	22.57	7.18	26.14	8.47	28.00	9.34	29.86	10.11	33.42	12.17	37.14	13.95
60%	10.0	16.14	2.57	19.29	3.02	22.43	3.50	24.00	3.75	25.57	4.00	28.71	4.53	31.86	5.08
	12.0	16.14	2.62	19.29	3.07	22.43	3.57	24.00	3.82	25.57	4.06	28.71	4.61	31.86	5.16
	14.0	16.14	2.65	19.29	3.12	22.43	3.62	24.00	3.88	25.57	4.15	28.71	4.69	31.86	5.26
	16.0	16.14	2.69	19.29	3.17	22.43	3.68	24.00	3.95	25.57	4.21	28.71	4.78	31.86	5.36
	18.0	16.14	2.74	19.29	3.22	22.43	3.75	24.00	4.01	25.57	4.30	28.71	4.86	31.86	5.46
	20.0	16.14	2.77	19.29	3.28	22.43	3.82	24.00	4.10	25.57	4.38	28.71	4.96	31.86	5.57
	21.0	16.14	2.80	19.29	3.30	22.43	3.85	24.00	4.13	25.57	4.41	28.71	5.01	31.86	5.62
	23.0	16.14	2.84	19.29	3.37	22.43	3.91	24.00	4.21	25.57	4.50	28.71	5.21	31.86	5.99
	25.0	16.14	2.89	19.29	3.42	22.43	4.06	24.00	4.41	25.57	4.78	28.71	5.56	31.86	6.39
	27.0	16.14	3.00	19.29	3.63	22.43	4.33	24.00	4.71	25.57	5.09	28.71	5.92	31.86	6.82
	29.0	16.14	3.17	19.29	3.85	22.43	4.61	24.00	5.01	25.57	5.42	28.71	6.32	31.86	7.28
	31.0	16.14	3.37	19.29	4.08	22.43	4.89	24.00	5.32	25.57	5.77	28.71	6.72	31.86	7.75
	33.0	16.14	3.55	19.29	4.33	22.43	5.19	24.00	5.66	25.57	6.14	28.71	7.15	31.86	8.26
	35.0	16.14	3.77	19.29	4.59	22.43	5.51	24.00	6.00	25.57	6.52	28.71	7.61	31.86	8.79
	37.0	16.14	3.98	19.29	4.86	22.43	5.84	24.00	6.37	25.57	6.92	28.71	8.10	31.86	9.36
	39.0	16.14	4.20	19.29	5.14	22.43	6.19	24.00	6.75	25.57	7.35	28.71	8.59	31.86	9.95
	42.0	16.14	4.38	19.29	5.44	22.43	6.49	24.00	7.11	25.57	7.71	28.71	9.13	31.86	10.55
	44.0	16.14	4.56	19.29	5.74	22.43	6.79	24.00	7.35	25.57	8.06	28.71	9.63	31.86	11.15
	46.0	16.14	4.80	19.29	6.00	22.43	7.03	24.00	7.65	25.57	8.49	28.71	9.97	31.86	11.75

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
50%	10.0	13.50	2.22	16.14	2.57	18.71	2.94	20.00	3.14	21.29	3.32	23.86	3.73	26.57	4.16
	12.0	13.50	2.24	16.14	2.60	18.71	2.99	20.00	3.17	21.29	3.38	23.86	3.80	26.57	4.23
	14.0	13.50	2.27	16.14	2.64	18.71	3.02	20.00	3.23	21.29	3.43	23.86	3.87	26.57	4.31
	16.0	13.50	2.31	16.14	2.67	18.71	3.07	20.00	3.28	21.29	3.48	23.86	3.93	26.57	4.38
	18.0	13.50	2.34	16.14	2.72	18.71	3.12	20.00	3.33	21.29	3.55	23.86	4.00	26.57	4.46
	20.0	13.50	2.37	16.14	2.75	18.71	3.17	20.00	3.38	21.29	3.62	23.86	4.06	26.57	4.55
	21.0	13.50	2.39	16.14	2.79	18.71	3.20	20.00	3.42	21.29	3.65	23.86	4.11	26.57	4.60
	23.0	13.50	2.42	16.14	2.82	18.71	3.25	20.00	3.48	21.29	3.72	23.86	4.18	26.57	4.69
	25.0	13.50	2.46	16.14	2.87	18.71	3.32	20.00	3.55	21.29	3.83	23.86	4.40	26.57	5.01
	27.0	13.50	2.50	16.14	2.99	18.71	3.50	20.00	3.78	21.29	4.06	23.86	4.68	26.57	5.34
	29.0	13.50	2.64	16.14	3.15	18.71	3.72	20.00	4.01	21.29	4.33	23.86	4.98	26.57	5.69
	31.0	13.50	2.79	16.14	3.33	18.71	3.93	20.00	4.26	21.29	4.60	23.86	5.29	26.57	6.06
	33.0	13.50	2.95	16.14	3.53	18.71	4.18	20.00	4.51	21.29	4.88	23.86	5.62	26.57	6.44
	35.0	13.50	3.12	16.14	3.73	18.71	4.41	20.00	4.78	21.29	5.16	23.86	5.97	26.57	6.83
	37.0	13.50	3.28	16.14	3.95	18.71	4.68	20.00	5.06	21.29	5.47	23.86	6.34	26.57	7.27
	39.0	13.50	3.47	16.14	4.16	18.71	4.94	20.00	5.36	21.29	5.81	23.86	6.72	26.57	7.71
	42.0	13.50	3.66	16.14	4.40	18.71	5.18	20.00	5.69	21.29	6.14	23.86	7.20	26.57	8.19
	44.0	13.50	3.85	16.14	4.64	18.71	5.42	20.00	6.03	21.29	6.28	23.86	7.67	26.57	8.67
	46.0	13.50	4.03	16.14	4.88	18.71	5.66	20.00	6.31	21.29	6.47	23.86	8.15	26.57	9.15

Note:

- *is shown as reference.*
- *In cooling mode, avoid the outdoor air temperature range from 42-46°C, when selecting the models.*
- *The above talbe shows the average value of conditions may operate.*
- *It is recommended to use capacity index less than 130%.*

Heating Mode: 4TVH0135

Table 15

TC: Total Capacity (kW) **WB:** Wet-bulb Temperature **DB:** Dry-bulb Temperature **PI:** Power Input (kW)

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
130%	-19.8	-20	29.14	7.91	29.00	8.46	28.86	9.02	28.86	9.30	28.72	9.58	28.72	10.14
	-18.8	-19	29.57	8.08	29.43	8.63	29.43	9.18	29.29	9.46	29.29	9.72	29.14	10.27
	-16.7	-17	30.71	8.46	30.57	8.98	30.43	9.52	30.43	9.78	30.43	10.04	30.29	10.57
	-13.7	-15	32.00	8.85	31 .86	9.36	31.71	9.87	31.71	10.11	31.57	10.38	31.57	10.89
	-11 .8	-13	33.29	9.24	33.29	9.74	33.14	10.22	33.00	10.46	33.00	10.71	32.86	11.19
	-9.8	-11	34.86	9.65	34.71	10 .11	34.57	10.58	34.57	10.81	34.57	11.04	34.43	11.51
	-9.5	-10	35.71	9.85	35.57	10.30	35.43	10.75	35.43	10.99	35.28	11.20	35.28	11.65
	-8.5	-9.1	36.43	10.03	36.29	10.46	36.29	10.91	36.14	11.13	36.14	11.35	36.00	11.80
	-7	-7.6	37.71	10.32	37.71	10.75	37.57	11.18	37.57	11.39	37.43	11.60	37.28	12.03
	-5	-5.6	39.71	10.71	39.57	11 .12	39.43	11.52	39.43	11.73	39.29	11.92	39.29	12.32
	-3	-3.7	41.57	11.06	41.43	11 .45	41 .43	11.83	41.28	12.03	41.28	12.22	41.14	12.60
	0	-0.7	44.85	11.60	44.85	11.96	44.71	12.31	44.71	12.44	44.57	12.67	44.57	13.02
	3	2.2	48.42	12.08	48.29	12.41	48.14	12.75	48.14	12.90	48.14	13.08	48.00	13.40
	5	4.1	50.85	12.38	50.71	12.70	50.71	13.01	50.57	13.17	50.57	13.33	50.43	13.63
	7	6	53.43	12.67	53.28	12.96	53.28	13.27	53.14	13.41	53.14	13.56	51.00	13.02
	9	7.9	56.14	12.93	56.00	13.22	56.00	13.50	55.86	13.65	54.71	13.36	51.00	12.24
	11	9.8	59.00	13.20	58.86	13.46	58.57	13.63	56.57	13.09	54.71	12.56	51.00	11.52
	13	11.8	62.14	13.44	62.00	13.70	58.57	12.77	56.57	12.26	54.71	11.79	51.00	10.81
	15	13.7	65.14	13.68	62.28	12.98	58.57	12.03	56.57	11.57	54.71	11.10	51.00	10.20
120%	-19.8	-20	29.00	8.66	28.86	9 .17	28.71	9.69	28.71	9.94	28.71	10.20	28.57	10.72
	-18.8	-19	29.43	8.82	29.29	9.33	29.29	9.84	29.14	10.09	29.14	10.35	29.00	10.86
	-16.7	-17	30.57	9.17	30.43	9.66	30.24	10.14	30.29	10.39	30.29	10.64	30.14	11.12
	-13.7	-15	31.86	9.53	31.72	10.00	31.57	10.46	31.57	10.71	31.57	10.94	31.43	11.41
	-11 .8	-13	33.15	9.90	33.15	10.35	33.00	10.80	33.00	11.03	32.86	11.25	32.86	11.70
	-9.8	-11	34.71	10.27	34.57	10.70	34.57	11.13	34.43	11.35	34.43	11.55	34.29	11.99
	-9.5	-10	35.58	10.46	35.43	10.89	35.29	11.29	35.29	11.51	35.29	11.71	35.14	12.13
	-8.5	-9.1	36.29	10.62	36.14	11.03	36.14	11.44	36.00	11.64	36.00	11.86	35.86	12.26
	-7	-7.6	37.57	10.90	37.57	11.29	37.43	11.68	37.43	11.89	37.29	12.08	37.29	12.47
	-5	-5.6	39.57	11 .25	39.43	11.63	39.28	12.00	39.28	12.19	39.28	12.38	39.15	12.75
	-3	-3.7	41.43	11.58	41.43	11.95	41.29	12.29	41.29	12.47	41.14	12.66	41.14	13.01
	0	-0.7	44.72	12.08	44.72	12.41	44.57	12.73	44.57	12.91	44.43	13.06	44.43	13.40
	3	2.2	48.29	12.53	48.14	12.83	48.14	13.14	48.00	13.30	48.00	13.44	47.00	13.37
	5	4.1	50.72	12.80	50.57	13.09	50.57	13.38	50.43	13.53	50.43	13.68	47.00	12.56
	7	6	53.29	13.06	53.29	13.34	53.15	13.62	52.29	13.43	50.57	12.88	47.00	11.82
	9	7.9	56.00	13.33	55.86	13.59	54.00	13.14	52.29	12.62	50.57	12.11	47.00	11.12
	11	9.8	58.86	13.56	57.43	13.33	54.00	12.35	52.29	11.87	50.57	11.39	47.00	10.48
	13	11.8	61.00	13.43	57.43	12.50	54.00	11.58	52.29	11.15	50.57	10.71	47.00	9.85
	15	13.7	61.00	12.64	57.43	11.77	54.00	10.93	52.29	10.51	50.57	10.10	47.00	9.30

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
110%	-19.8	-20	28.86	9.42	28.72	9.88	28.57	10.36	28.57	10.60	28.58	10.83	28.43	11.31
	-18.8	-19	29.29	9.56	29.14	10.03	29.14	10.49	29.14	10.73	29.00	10.96	29.00	11.42
	-16.7	-17	30.43	9.88	30.29	10.33	30.71	10.78	30.14	11.00	30.14	11.23	30.00	11.67
	-13.7	-15	31.72	10.22	31.58	10.65	31 .43	11.07	31.43	11.29	31 .43	11.51	31.28	11.93
	-11 .8	-13	33.00	10.56	33.00	10.97	32.86	11.38	32.86	11.58	32.71	11.79	32.71	12.21
	-9.8	-11	34.57	10.90	34.43	11 .29	34.43	11.68	34.28	11.89	34.28	12.08	34.28	12.47
	-9.5	-10	35.43	11.07	35.29	11 .45	35.14	11.84	35.14	12.03	35.14	12.22	35.00	12.60
	-8.5	-9.1	36.14	11.22	36.00	11.60	36.00	11.97	35.86	12.16	35.86	12.35	35.86	11.26
	-7	-7.6	37.43	11.48	37.43	11.83	37.29	12.19	37.29	12.38	37.29	12.56	37.14	12.92
	-5	-5.6	39.43	11.80	39.29	12.15	39.14	12.48	39.14	12.66	39.14	12.83	39.00	13.18
	-3	-3.7	41.29	12.11	41.29	12.43	41.14	12.76	41.14	12.92	41.00	13.08	41.00	13.41
	0	-0.7	44.57	12.56	44.57	12.86	44.43	13.17	44.43	13.31	44.43	13.47	43.14	13.21
	3	2.2	48.14	12.98	48.00	13.25	48.00	13.53	47.86	13.66	46.29	13.11	43.14	12.02
	5	4.1	50.57	13.22	50.57	13.50	49.57	13.37	47.86	12.83	46.29	12.32	43.14	11.31
	7	6	53.14	13.47	52.71	13.56	49.57	12.56	47.86	12.06	46.29	11.58	43.14	10.64
	9	7.9	55.86	13.69	52.71	12.74	49.57	11.81	47.86	11.35	46.29	10.90	43.14	10.03
	11	9.8	55.86	12.88	52.71	11.99	49.57	11.12	47.86	10.70	46.29	10.27	43.14	9.46
	13	11.8	55.86	12.08	52.71	11 .25	49.57	10.45	47.86	10.06	46.29	9.66	43.14	8.91
	15	13.7	55.86	10.73	52.71	10.61	49.57	9.87	47.86	9.49	46.29	9.14	43.14	8.43
100%	-19.8	-20	28.71	10.17	28.57	10.59	28.57	11.03	28.43	11.25	28.43	11.45	28.29	11.89
	-18.8	-19	29.14	10.30	29.14	10.72	29.00	11.15	29.00	11.36	28.86	11.58	28.86	12.00
	-16.7	-17	30.29	10.59	30.14	11.00	30.14	11.41	30.00	11.61	30.00	11.81	30.00	12.22
	-13.7	-15	31.57	10.90	31.43	11.29	31.28	11.68	31.28	11.89	31.28	12.08	31.14	12.47
	-11 .8	-13	32.86	11.22	32.86	11.58	32.72	11.96	32.72	12.15	32.72	12.34	32.57	12.72
	-9.8	-11	34.43	11.52	34.29	11.89	34.29	12.24	34.29	12.43	34.14	12.60	34.14	12.95
	-9.5	-10	35.28	11.68	35.15	12.03	35.15	12.38	35.00	12.56	35.00	12.73	34.86	13.08
	-8.5	-9.1	36.00	11.81	35.86	12.16	35.86	12.50	35.86	12.67	35.72	12.85	35.72	13.18
	-7	-7.6	37.29	12.05	37.29	12.38	37.14	12.70	37.14	12.88	37.14	13.04	37.00	13.37
	-5	-5.6	39.29	12.35	39.14	12.66	39.14	12.98	39.00	13.12	39.00	13.28	38.86	13.60
	-3	-3.7	41.14	12.63	41.14	11.47	41.00	13.22	41.00	13.37	41.00	13.52	39.29	12.95
	0	-0.7	44.43	13.04	44.43	13.31	44.28	13.59	43.57	13.37	42.14	12.82	39.29	11.76
	3	2.2	48.00	13.41	47.86	13.66	45.00	12.64	43.57	12.15	42.14	11.67	39.29	10.71
	5	4.1	50.43	13.66	47.86	12.83	45.00	11.89	43.57	11.44	42.14	10.99	39.29	10.10
	7	6	50.72	12.96	47.86	12.06	45.00	11.19	43.57	10.77	42.14	10.35	39.29	9.52
	9	7.9	50.72	12.18	47.86	11.35	45.00	10.54	43.57	10.01	42.14	9.75	39.29	8.98
	11	9.8	50.72	11.47	47.86	10.70	45.00	9.94	43.57	9.56	42.14	9.20	39.29	8.49
	13	11.8	50.72	10.77	47.86	10.06	45.00	9.36	43.57	9.01	42.14	8.68	39.29	8.01
	15	13.7	50.72	10.16	47.86	9.49	45.00	8.84	43.57	8.52	42.14	8.20	39.29	7.59

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
90%	-19.8	-20	28.52	10.93	28.38	11.31	28.38	11.70	28.24	11.89	28.24	12.09	28.24	2.47
	-18.8	-19	28.95	11.04	28.95	11.44	28.81	11.81	28.81	12.00	28.81	12.19	28.66	2.57
	-16.7	-17	30.09	11.32	29.95	11.68	29.95	12.05	29.95	12.24	29.80	12.41	29.80	2.77
	-13.7	-15	31.37	11.60	31.23	11.95	31.23	12.29	31.09	12.47	31.09	12.64	31.09	2.99
	-11 .8	-13	32.66	11.87	32.66	12.21	32.51	12.54	32.51	12.72	32.51	12.88	32.37	3.21
	-9.8	-11	34.23	12.15	34.23	12.47	34.08	12.79	34.08	12.95	34.08	13.12	33.94	3.44
	-9.5	-10	35.08	12.29	34.94	12.61	34.94	12.92	34.80	13.08	34.80	13.24	34.80	3.54
	-8.5	-9.1	35.79	12.43	35.79	12.73	35.65	13.04	35.65	13.18	35.65	13.34	35.22	3.47
	-7	-7.6	37.08	12.63	37.08	12.92	36.94	13.22	36.94	13.37	36.94	13.51	35.22	2.86
	-5	-5.6	39.07	12.90	38.93	13.18	38.93	13.46	38.79	13.60	37.79	13.18	35.22	2.09
	-3	-3.7	40.93	13.15	40.93	13.41	40.50	13.47	39.07	12.93	37.79	12.41	35.22	11.39
	0	-0.7	44.35	13.53	43.07	13.20	40.50	12.22	39.07	11.74	37.79	11.28	35.22	0.36
	3	2.2	45.64	12.89	43.07	12.00	40.50	11.13	39.07	10.71	37.79	10.29	35.22	9.47
	5	4.1	45.64	12.12	43.07	11.29	40.50	10.49	39.07	10.09	37.79	9.71	35.22	8.94
	7	6	45.64	11.39	43.07	10.64	40.50	9.88	39.07	9.52	37.79	9.16	35.22	8.44
	9	7.9	45.64	10.74	43.07	10.01	40.50	9.31	39.07	8.98	37.79	8.65	35.22	7.98
	11	9.8	45.64	10.11	43.07	9.45	40.50	8.81	39.07	8.49	37.79	8.17	35.22	7.56
	13	11.8	45.64	9.52	43.07	8.91	40.50	8.30	39.07	8.01	37.79	7.72	35.22	7.14
	15	13.7	45.64	9.00	43.07	8.41	40.50	7.86	39.07	7.59	37.79	7.31	35.22	6.77
80%	-19.8	-20	28.43	11.68	28.29	12.02	28.29	12.37	28.29	12.54	28.14	12.72	28.14	3.05
	-18.8	-19	28.86	11.79	28.86	12.13	28.71	12.47	28.71	12.64	28.71	12.80	28.57	3.15
	-16.7	-17	30.00	12.03	29.86	12.35	29.86	12.69	29.86	12.85	29.86	13.01	29.71	3.33
	-13.7	-15	31.28	12.28	31.14	12.58	31.14	12.90	31.14	13.05	31.00	13.21	31.00	3.53
	-11 .8	-13	32.57	12.53	32.57	12.83	32.43	13.12	32.43	13.27	32.43	13.43	31.43	3.06
	-9.8	-11	34.14	12.77	34.14	13.06	34.00	13.35	34.00	13.49	33.71	13.46	31.43	2.34
	-9.5	-10	35.00	12.90	34.85	13.18	34.86	13.46	34.86	13.60	33.71	13.06	31.43	11.97
	-8.5	-9.1	35.72	13.02	33.20	13.30	35.57	13.56	34.86	13.25	33.71	12.72	31.43	11.65
	-7	-7.6	37.00	13.21	37.00	13.47	36.00	13.18	34.86	12.66	33.71	12.15	31.43	11.15
	-5	-5.6	39.00	13.44	38.29	13.37	36.00	12.38	34.86	11.90	33.71	11.42	31.43	0.49
	-3	-3.7	40.57	13.52	38.29	12.58	36.00	11.65	34.86	11.22	33.71	10.77	31.43	9.91
	0	-0.7	40.57	12.27	38.29	11.42	36.00	10.61	34.86	10.22	33.71	9.81	31.43	9.04
	3	2.2	40.57	11.17	38.29	10.42	36.00	9.69	34.86	9.33	33.71	8.98	31.43	8.28
	5	4.1	40.57	10.52	38.29	9.82	36.00	9.14	34.86	8.81	33.71	8.49	31.43	7.83
	7	6	40.57	9.91	38.29	9.27	36.00	8.63	34.86	8.33	33.71	8.02	31.43	7.41
	9	7.9	40.57	9.36	38.29	8.75	36.00	8.15	34.86	7.86	33.71	7.59	31.43	7.02
	11	9.8	40.57	8.84	38.29	8.27	36.00	7.72	34.86	7.44	33.71	7.18	31.43	6.66
	13	11.8	40.57	8.33	38.29	7.80	36.00	7.29	34.86	7.03	33.71	6.79	31.43	6.29
	15	13.7	40.57	7.88	38.29	7.40	36.00	6.92	34.86	6.67	33.71	6.44	31.43	5.99

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
70%	-19.8	-20	28.22	12.44	28.08	12.73	28.08	13.04	28.08	13.18	28.08	13.34	27.37	13.19
	-18.8	-19	28.65	12.54	28.65	12.83	28.51	13.12	28.51	13.27	28.51	13.43	27.37	12.92
	-16.7	-17	29.79	12.74	29.79	13.04	29.65	13.31	29.65	13.46	29.36	11.99	27.37	12.32
	-13.7	-15	31.07	12.96	30.93	13.24	30.93	13.51	30.36	13.31	29.36	12.77	27.37	11.71
	-11 .8	-13	32.35	13.18	32.35	13.44	31.50	13.12	30.36	12.61	29.36	12 .11	27.37	11.10
	-9.8	-11	33.92	13.40	33.49	13.38	31.50	12.40	30.36	11.92	29.36	11.44	27.37	10.51
	-9.5	-10	34.78	13.51	33.49	12.99	31.50	12.03	30.36	11.57	29.36	11.12	27.37	10.22
	-8.5	-9.1	35.49	13.59	33.49	12.64	31.50	11.71	30.36	11.26	29.36	10.83	27.37	9.95
	-7	-7.6	35.49	12.98	33.49	12.08	31.50	11.20	30.36	10.78	29.36	10.36	27.37	9.53
	-5	-5.6	35.49	12.19	33.49	11.36	31.50	10.55	30.36	10.14	29.36	11.98	27.37	9.00
	-3	-3.7	35.49	11.48	33.49	10.71	31.50	9.95	30.36	9.58	29.36	9.21	27.37	8.50
	0	-0.7	35.49	10.45	33.49	9.77	31.50	9.08	30.36	8.75	29.36	8.43	27.37	7.79
	3	2.2	35.49	9.55	33.49	8.94	31.50	8.33	30.36	8.02	29.36	7.73	27.37	7.15
	5	4.1	35.49	9.01	33.49	8.43	31.50	7.88	30.36	7.59	29.36	7.31	27.37	6.77
	7	6	35.49	8.52	33.49	7.98	31.50	7.44	30.36	7.18	29.36	6.93	27.37	6.42
	9	7.9	35.49	8.05	33.49	7.54	31.50	7.05	30.36	6.80	29.36	6.57	27.37	6.09
	11	9.8	35.49	7.61	33.49	7.14	31.50	6.68	30.36	6.45	29.36	6.23	27.37	5.78
	13	11.8	35.49	7.19	33.49	6.76	31.50	6.32	30.36	6.12	29.36	5.90	27.37	5.49
	15	13.7	35.49	6.82	33.49	6.41	31.50	6.00	30.36	5.81	29.36	5.61	27.37	5.23
60%	-19.8	-20	28.14	13.19	28.00	13.44	27.00	12.93	26.14	12.42	25.29	11.93	23.57	10.94
	-18.8	-19	28.57	13.28	28.57	13.53	27.00	12.66	26.14	12.16	25.29	11.67	23.57	10.71
	-16.7	-17	29.71	13.46	28.71	13.03	27.00	12.08	26.14	11.61	25.29	11.15	23.57	10.24
	-13.7	-15	30.43	13.31	28.71	12.38	27.00	11.48	26.14	11.04	25.29	10.61	23.57	9.75
	-11 .8	-13	30.43	12.60	28.71	11.73	27.00	10.88	26.14	10.48	25.29	10.07	23.57	9.31
	-9.8	-11	30.43	11.90	28.71	11.09	27.00	10.30	26.14	9.91	25.29	9.53	23.57	8.79
	-9.5	-10	30.43	11.57	28.71	10.78	27.00	10.01	26.14	9.65	25.29	9.27	23.57	8.54
	-8.5	-9.1	30.43	11.26	28.71	10.51	27.00	9.77	26.14	9.40	25.29	9.04	23.57	8.34
	-7	-7.6	30.43	10.77	28.71	10.06	27.00	9.34	26.14	9.01	25.29	8.66	23.57	8.01
	-5	-5.6	30.43	10.14	28.71	9.47	27.00	8.82	26.14	8.50	25.29	8.18	23.57	7.57
	-3	-3.7	30.43	9.58	28.71	8.95	27.00	8.34	26.14	8.05	25.29	7.75	23.57	7.16
	0	-0.7	30.43	8.75	28.71	8.20	27.00	7.64	26.14	7.38	25.29	7.11	23.57	6.58
	3	2.2	30.43	8.02	28.71	7.53	27.00	7.03	26.14	6.79	25.29	6.55	23.57	6.07
	5	4.1	30.43	7.59	28.71	7.12	27.00	6.66	26.14	6.44	25.29	6.21	23.57	5.77
	7	6	30.43	7.18	28.71	6.74	27.00	6.31	26.14	6.10	25.29	5.90	23.57	5.48
	9	7.9	30.43	6.80	28.71	6.39	27.00	5.99	26.14	5.80	25.29	5.59	23.57	5.22
	11	9.8	30.43	6.45	28.71	6.07	27.00	5.70	26.14	5.51	25.29	5.32	23.57	4.97
	13	11.8	30.43	6.10	28.71	5.75	27.00	5.41	26.14	5.23	25.29	5.06	23.57	4.72
	15	13.7	30.43	5.81	28.71	5.46	27.00	5.14	26.14	4.98	25.29	4.82	23.57	4.50

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
50%	-19.8	-20	25.35	12.00	23.92	11.17	22.50	10.38	21.65	10.00	20.93	9.61	19.51	8.85
	-18.8	-19	25.35	11.74	23.92	10.94	22.50	10.17	21.65	9.78	20.93	9.40	19.51	8.68
	-16.7	-17	25.35	11.20	23.92	10.45	22.50	9.72	21.65	9.36	20.93	9.01	19.51	8.31
	-13.7	-15	25.35	10.67	23.92	9.95	22.50	9.26	21.65	8.92	20.93	8.59	19.51	7.93
	-11 .8	-13	25.35	10.13	23.92	9.46	22.50	8.81	21.65	8.49	20.93	8.17	19.51	7.56
	-9.8	-11	25.35	9.59	23.92	8.97	22.50	8.36	21.65	8.05	20.93	7.76	19.51	7.18
	-9.5	-10	25.35	9.33	23.92	8.72	22.50	8.14	21.65	7.85	20.93	7.56	19.51	6.99
	-8.5	-9.1	25.35	9.10	23.92	8.52	22.50	7.93	21.65	7.66	20.93	7.38	19.51	6.83
	-7	-7.6	25.35	8.72	23.92	8.17	22.50	7.61	21.65	7.35	20.93	7.09	19.51	6.57
	-5	-5.6	25.35	8.23	23.92	7.72	22.50	7.21	21.65	6.96	20.93	6.71	19.51	6.22
	-3	-3.7	25.35	7.79	23.92	7.31	22.50	6.83	21.65	6.60	20.93	6.36	19.51	5.91
	0	-0.7	25.35	7.15	23.92	6.71	22.50	6.29	21.65	6.07	20.93	5.87	19.51	5.46
	3	2.2	25.35	6.58	23.92	6.19	22.50	5.80	21.65	5.61	20.93	5.42	19.51	5.06
	5	4.1	25.35	6.25	23.92	5.87	22.50	5.51	21.65	5.33	20.93	5.16	19.51	4.81
	7	6	25.35	5.93	23.92	5.58	22.50	5.25	21.65	5.07	20.93	4.91	19.51	4.59
	9	7.9	25.35	5.62	23.92	5.30	22.50	4.98	21.6	4.84	20.93	4.68	19.51	4.37
	11	9.8	25.35	5.35	23.92	5.04	22.50	4.75	21.65	4.61	20.93	4.46	19.51	4.17
	13	11.8	25.35	5.09	23.92	4.80	22.50	4.52	21.65	4.39	20.93	4.24	19.51	3.98
	15	13.7	25.35	4.84	23.92	4.58	22.50	4.32	21.65	4.19	20.93	4.05	19.51	3.81

Note:

- *is shown as reference.*
- *In heating mode, avoid the outdoor air temperature range from -15–20 °C, when selecting the models.*
- *The above talbe shows the average value of conditions may operate.*
- *It is recommended to use capacity index less than 130%.*

Cooling Mode: 4TVH0155

Table 16

TC: Total Capacity (kW) **WB:** Wet-bulb Temperature **DB:** Dry-bulb Temperature **PI:** Power Input (kW)

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
130%	10.0	39.54	6.46	47.09	7.90	54.64	9.39	56.73	9.60	57.37	9.41	58.82	9.01	60.27	8.60
	12.0	39.54	6.58	47.09	8.05	54.64	9.58	55.93	9.54	56.73	9.35	58.02	8.94	59.46	8.81
	14.0	39.54	6.71	47.09	8.20	54.48	9.69	55.29	9.58	55.93	9.30	57.37	9.22	58.82	9.32
	16.0	39.54	6.82	47.09	8.37	53.84	9.66	54.48	9.51	55.12	9.62	56.57	9.71	58.02	9.81
	18.0	39.54	6.95	47.09	8.54	53.04	10.01	53.68	10.07	54.48	10.13	55.93	10.22	57.37	10.32
	20.0	39.54	7.11	47.09	9.09	52.23	10.51	53.04	10.56	53.68	10.62	55.12	10.71	56.57	10.83
	21.0	39.54	7.29	47.09	9.41	51.91	10.75	52.71	10.81	53.35	10.87	54.80	10.98	56.25	11.07
	23.0	39.54	7.82	47.09	10.09	51.27	11.24	51.91	11.30	52.55	11.36	54.00	11.47	55.44	11.58
	25.0	39.54	8.35	47.09	10.81	50.46	11.73	51.10	11.79	51.91	11.87	53.35	11.98	54.80	12.09
	27.0	39.54	8.92	47.09	11.57	49.82	12.23	50.46	12.30	51.10	12.36	52.55	12.49	54.00	12.62
	29.0	39.54	9.52	47.09	12.36	49.02	12.72	49.66	12.79	50.46	12.87	51.91	13.00	53.35	13.13
	31.0	39.54	10.17	46.93	13.08	48.21	13.23	49.02	13.30	49.66	13.36	51.10	13.51	52.55	13.66
	33.0	39.54	10.83	46.12	13.57	47.57	13.72	48.21	13.79	49.02	13.87	50.46	14.02	51.75	14.17
	35.0	39.54	11.55	45.32	14.06	46.77	14.23	47.57	14.30	48.21	14.38	49.66	14.55	51.10	14.70
	37.0	39.54	12.28	44.68	14.57	46.12	14.74	46.77	14.82	47.57	14.91	48.85	15.08	50.30	15.25
	39.0	39.54	13.08	43.87	14.72	45.32	15.23	46.12	15.32	46.77	15.42	48.21	15.59	49.66	15.78
	42.0	39.54	13.76	43.42	14.86	44.84	15.37	45.65	15.47	46.29	15.56	47.74	15.62	47.76	15.92
	44.0	39.54	14.46	42.97	15.01	44.37	15.46	45.17	15.61	45.34	15.60	46.00	15.68	46.62	15.99
	46.0	39.54	15.16	42.79	15.15	43.89	15.66	44.70	15.67	44.96	15.71	45.19	15.74	45.90	16.52
120%	10.0	36.48	5.90	43.39	7.20	50.47	8.56	54.00	9.26	56.57	9.66	57.86	9.28	59.14	8.92
	12.0	36.48	6.01	43.39	7.33	50.47	8.73	54.00	9.43	55.77	9.60	57.05	9.24	58.34	8.86
	14.0	36.48	6.12	43.39	7.48	50.47	8.90	54.00	9.62	54.96	9.54	56.41	9.18	57.69	9.24
	16.0	36.48	6.24	43.39	7.63	50.47	9.07	53.68	9.69	54.32	9.56	55.61	9.66	56.89	9.73
	18.0	36.48	6.35	43.39	7.79	50.47	9.37	52.88	10.01	53.52	10.05	54.80	10.15	56.25	10.24
	20.0	36.48	6.48	43.39	8.09	50.47	10.09	52.23	10.51	52.88	10.54	54.16	10.64	55.45	10.73
	21.0	36.48	6.54	43.39	8.37	50.47	10.45	51.75	10.75	52.39	10.79	53.84	10.88	55.13	11.00
	23.0	36.48	6.99	43.39	8.97	50.47	11.19	51.11	11.22	51.75	11.28	53.03	11.39	54.32	11.49
	25.0	36.48	7.46	43.39	9.60	49.66	11.68	50.30	11.72	50.95	11.77	52.39	11.88	53.68	12.00
	27.0	36.48	7.97	43.39	10.26	49.02	12.15	49.66	12.23	50.30	12.28	51.59	12.39	52.88	12.51
	29.0	36.48	8.50	43.39	10.96	48.21	12.64	48.86	12.72	49.50	12.77	50.79	12.90	52.23	13.02
	31.0	36.48	9.07	43.39	11.70	47.41	13.15	48.21	13.21	48.86	13.28	50.14	13.41	51.43	13.55
	33.0	36.48	9.66	43.39	12.47	46.76	13.64	47.41	13.72	48.05	13.77	49.34	13.93	50.62	14.06
	35.0	36.48	10.28	43.39	13.30	45.96	14.13	46.61	14.21	47.41	14.28	48.69	14.44	49.98	14.59
	37.0	36.48	10.94	43.39	14.17	45.32	14.64	45.96	14.72	46.61	14.79	47.89	14.95	49.18	15.12
	39.0	36.48	11.64	43.23	14.97	44.52	15.14	45.16	15.23	45.80	15.31	47.25	15.48	48.54	15.63
	42.0	36.48	12.07	42.77	15.11	44.05	15.28	44.70	15.37	45.34	15.45	46.78	15.53	46.67	15.78
	44.0	36.48	12.21	42.54	15.25	43.59	15.39	44.23	15.42	44.87	15.49	45.39	15.59	46.14	16.34
	46.0	36.48	12.35	42.30	15.39	43.21	15.56	43.76	15.66	44.55	15.69	44.92	15.63	45.74	16.48

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
110%	10.0	33.43	5.35	39.86	6.52	46.29	7.75	49.50	8.37	52.71	9.01	56.73	9.56	58.02	9.24
	12.0	33.43	5.46	39.86	6.65	46.29	7.90	49.50	8.54	52.71	9.18	56.09	9.52	57.22	9.18
	14.0	33.43	5.56	39.86	6.77	46.29	8.05	49.50	8.69	52.71	9.35	55.29	9.47	56.57	9.17
	16.0	33.43	5.65	39.86	6.90	46.29	8.20	49.50	8.86	52.71	9.54	54.65	9.58	55.77	9.67
	18.0	33.43	5.76	39.86	7.03	46.29	8.37	49.50	9.11	52.71	10.00	53.84	10.07	55.13	10.17
	20.0	33.43	5.88	39.86	7.18	46.29	8.86	49.50	9.79	51.91	10.49	53.20	10.56	54.33	10.66
	21.0	33.43	5.93	39.86	7.39	46.29	9.18	49.50	10.15	51.59	10.73	52.72	10.81	54.00	10.90
	23.0	33.43	6.22	39.86	7.92	46.29	9.85	49.50	10.88	50.79	11.20	52.08	11.32	53.20	11.41
	25.0	33.43	6.63	39.86	8.46	46.29	10.52	49.50	11.66	50.14	11.70	51.27	11.81	52.55	11.90
	27.0	33.43	7.07	39.86	9.05	46.29	11.26	48.70	12.15	49.34	12.19	50.63	12.30	51.75	12.41
	29.0	33.43	7.54	39.86	9.66	46.29	12.04	48.05	12.64	48.70	12.70	49.82	12.81	51.11	12.93
	31.0	33.43	8.03	39.86	10.30	46.29	12.85	47.25	13.13	47.89	13.19	49.18	13.30	50.30	13.43
	33.0	33.43	8.54	39.86	10.98	45.97	13.55	46.61	13.62	47.25	13.68	48.38	13.81	49.66	13.95
	35.0	33.43	9.09	39.86	11.70	45.16	14.04	45.81	14.12	46.45	14.19	47.57	14.32	48.86	14.46
	37.0	33.43	9.67	39.86	12.45	44.52	14.55	45.16	14.61	45.65	14.68	46.93	14.83	48.05	14.97
	39.0	33.43	10.28	39.86	13.27	43.72	15.04	44.36	15.12	45.00	15.19	46.13	15.34	47.41	15.49
	42.0	33.43	10.42	39.86	13.41	43.26	15.18	43.90	15.26	44.55	15.33	45.35	15.48	45.51	15.64
	44.0	33.43	10.56	39.86	13.55	42.80	15.32	43.44	15.40	44.09	15.47	44.92	15.53	45.05	16.20
	46.0	33.43	10.83	39.86	13.69	42.39	15.46	42.98	15.63	43.76	15.62	44.43	16.33	44.66	16.37
100%	10.0	30.38	4.84	36.16	5.86	42.11	6.93	45.00	7.50	47.89	8.07	53.84	9.22	56.89	9.54
	12.0	30.38	4.91	36.16	5.97	42.11	7.07	45.00	7.63	47.89	8.22	53.84	9.39	56.09	9.48
	14.0	30.38	5.01	36.16	6.08	42.11	7.20	45.00	7.79	47.89	8.37	53.84	9.58	55.44	9.43
	16.0	30.38	5.10	36.16	6.20	42.11	7.35	45.00	7.94	47.89	8.54	53.52	9.69	54.64	9.60
	18.0	30.38	5.20	36.16	6.31	42.11	7.48	45.00	8.09	47.89	8.71	52.88	10.01	54.00	10.09
	20.0	30.38	5.29	36.16	6.44	42.11	7.71	45.00	8.50	47.89	9.33	52.07	10.49	53.19	10.58
	21.0	30.38	5.35	36.16	6.50	42.11	7.99	45.00	8.80	47.89	9.66	51.75	10.73	52.88	10.83
	23.0	30.38	5.48	36.16	6.93	42.11	8.56	45.00	9.43	47.89	10.35	51.11	11.22	52.07	11.32
	25.0	30.38	5.84	36.16	7.41	42.11	9.16	45.00	10.11	47.89	11.09	50.31	11.72	51.43	11.81
	27.0	30.38	6.23	36.16	7.90	42.11	9.79	45.00	10.81	47.89	11.87	49.50	12.21	50.63	12.32
	29.0	30.38	6.63	36.16	8.43	42.11	10.45	45.00	11.55	47.73	12.60	48.86	12.72	49.98	12.81
	31.0	30.38	7.07	36.16	8.99	42.11	11.15	45.00	12.32	47.09	13.09	48.06	13.21	49.18	13.32
	33.0	30.38	7.50	36.16	9.58	42.11	11.88	45.00	13.15	46.29	13.59	47.41	13.70	48.54	13.83
	35.0	30.38	7.97	36.16	10.18	42.11	12.68	45.00	14.02	45.48	14.08	46.61	14.21	47.73	14.32
	37.0	30.38	8.48	36.16	10.85	42.11	13.51	44.19	14.51	44.84	14.59	45.96	14.72	46.93	14.83
	39.0	30.38	9.01	36.16	11.53	42.11	14.38	43.55	15.00	44.03	15.08	45.16	15.21	46.29	15.36
	42.0	30.38	9.57	36.16	12.09	42.11	15.08	42.65	15.14	43.58	15.39	44.12	15.57	45.39	15.78
	44.0	30.38	10.13	36.16	12.65	42.11	15.28	41.75	15.42	43.18	15.53	45.16	15.77	44.23	15.92
	46.0	30.38	10.69	36.16	13.21	42.11	15.60	40.85	15.56	43.13	15.95	43.36	16.05	43.59	16.20

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
90%	10.0	27.32	4.33	32.63	5.21	37.93	6.16	40.50	6.65	43.07	7.14	48.37	8.16	53.68	9.20
	12.0	27.32	4.40	32.63	5.31	37.93	6.27	40.50	6.76	43.07	7.27	48.37	8.31	53.68	9.37
	14.0	27.32	4.48	32.63	5.40	37.93	6.39	40.50	6.90	43.07	7.41	48.37	8.46	53.68	9.54
	16.0	27.32	4.55	32.63	5.50	37.93	6.52	40.50	7.03	43.07	7.56	48.37	8.63	53.52	9.71
	18.0	27.32	4.63	32.63	5.61	37.93	6.63	40.50	7.16	43.07	7.71	48.37	8.80	52.88	10.01
	20.0	27.32	4.72	32.63	5.74	37.93	6.76	40.50	7.31	43.07	7.99	48.37	9.47	52.07	10.49
	21.0	27.32	4.76	32.63	5.78	37.93	6.88	40.50	7.56	43.07	8.28	48.37	9.81	51.75	10.73
	23.0	27.32	4.86	32.63	6.01	37.93	7.37	40.50	8.11	43.07	8.88	48.37	10.52	50.94	11.22
	25.0	27.32	5.12	32.63	6.42	37.93	7.88	40.50	8.67	43.07	9.48	48.37	11.26	50.31	11.71
	27.0	27.32	5.44	32.63	6.84	37.93	8.41	40.50	9.26	43.07	10.15	48.37	12.05	49.50	12.21
	29.0	27.32	5.80	32.63	7.29	37.93	8.97	40.50	9.88	43.07	10.85	47.89	12.60	48.86	12.70
	31.0	27.32	6.16	32.63	7.77	37.93	9.56	40.50	10.54	43.07	11.56	47.09	13.09	48.05	13.21
	33.0	27.32	6.54	32.63	8.26	37.93	10.20	40.50	11.24	43.07	12.34	46.45	13.60	47.41	13.70
	35.0	27.32	6.95	32.63	8.79	37.93	10.86	40.50	11.98	43.07	13.15	45.64	14.10	46.61	14.21
	37.0	27.32	7.37	32.63	9.33	37.93	11.56	40.50	12.75	43.07	14.02	44.84	14.59	45.96	14.70
	39.0	27.32	7.82	32.63	9.94	37.93	12.30	40.50	13.59	43.07	14.93	44.20	15.10	45.16	15.21
	42.0	27.32	8.18	32.63	0.54	37.93	12.90	40.50	14.06	43.07	15.05	43.79	15.61	44.76	15.69
	44.0	27.32	8.78	32.63	11.14	37.93	13.50	40.50	14.54	43.07	15.63	43.54	15.76	44.19	15.93
	46.0	27.32	9.26	32.63	11.62	37.93	13.98	40.50	15.02	43.07	15.90	43.30	15.94	43.40	16.11
80%	10.0	24.27	3.84	28.93	4.59	33.59	5.40	36.00	5.82	38.41	6.24	43.07	7.12	47.73	8.03
	12.0	24.27	3.89	28.93	4.67	33.59	5.50	36.00	5.93	38.41	6.37	43.07	7.26	47.73	8.18
	14.0	24.27	3.97	28.93	4.76	33.59	5.59	36.00	6.03	38.41	6.48	43.07	7.39	47.73	8.33
	16.0	24.27	4.02	28.93	4.84	33.59	5.71	36.00	6.14	38.41	6.59	43.07	7.54	47.73	8.48
	18.0	24.27	4.10	28.93	4.93	33.59	5.82	36.00	6.27	38.41	6.73	43.07	7.69	47.73	8.65
	20.0	24.27	4.18	28.93	5.03	33.59	5.93	36.00	6.39	38.41	6.86	43.07	7.97	47.73	9.26
	21.0	24.27	4.21	28.93	5.06	33.59	5.99	36.00	6.46	38.41	7.01	43.07	8.26	47.73	9.60
	23.0	24.27	4.29	28.93	5.18	33.59	6.27	36.00	6.88	38.41	7.50	43.07	8.84	47.73	10.30
	25.0	24.27	4.42	28.93	5.50	33.59	6.71	36.00	7.35	38.41	8.01	43.07	9.47	47.73	11.02
	27.0	24.27	4.71	28.93	5.86	33.59	7.14	36.00	7.84	38.41	8.56	43.07	10.11	47.73	11.79
	29.0	24.27	5.01	28.93	6.24	33.59	7.62	36.00	8.35	38.41	9.15	43.07	10.79	47.73	12.60
	31.0	24.27	5.31	28.93	6.63	33.59	8.11	36.00	8.90	38.41	9.75	43.07	11.53	46.93	13.10
	33.0	24.27	5.65	28.93	7.05	33.59	8.64	36.00	9.49	38.41	10.37	43.07	12.28	46.29	13.59
	35.0	24.27	5.99	28.93	7.50	33.59	9.18	36.00	10.09	38.41	11.05	43.07	13.10	45.48	14.08
	37.0	24.27	6.35	28.93	7.95	33.59	9.77	36.00	10.75	38.41	11.77	43.07	13.96	44.84	14.57
	39.0	24.27	6.73	28.93	8.48	33.59	10.39	36.00	11.43	38.41	12.53	43.07	14.87	44.04	15.08
	42.0	24.27	6.93	28.93	8.58	33.59	10.59	36.00	11.84	38.41	12.83	43.07	15.38	43.68	15.43
	44.0	24.27	7.23	28.93	8.69	33.59	10.80	36.00	12.04	38.41	13.03	43.07	15.48	43.32	15.58
	46.0	24.27	7.33	28.93	8.79	33.59	11.01	36.00	12.34	38.41	13.28	43.07	15.71	42.96	15.94

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
70%	10.0	21.22	3.38	25.39	4.01	29.41	4.67	31.50	5.03	33.59	5.39	37.61	6.12	41.78	6.88
	12.0	21.22	3.42	25.39	4.06	29.41	4.76	31.50	5.12	33.59	5.48	37.61	6.24	41.78	7.01
	14.0	21.22	3.48	25.39	4.14	29.41	4.84	31.50	5.20	33.59	5.57	37.61	6.35	41.78	7.14
	16.0	21.22	3.53	25.39	4.21	29.41	4.93	31.50	5.31	33.59	5.69	37.61	6.46	41.78	7.27
	18.0	21.22	3.59	25.39	4.29	29.41	5.03	31.50	5.40	33.59	5.78	37.61	6.59	41.78	7.43
	20.0	21.22	3.65	25.39	4.37	29.41	5.12	31.50	5.50	33.59	5.90	37.61	6.73	41.78	7.63
	21.0	21.22	3.68	25.39	4.40	29.41	5.16	31.50	5.56	33.59	5.95	37.61	6.82	41.78	7.90
	23.0	21.22	3.74	25.39	4.48	29.41	5.27	31.50	5.74	33.59	6.25	37.61	7.31	41.78	8.47
	25.0	21.22	3.82	25.39	4.67	29.41	5.61	31.50	6.14	33.59	6.67	37.61	7.82	41.78	9.05
	27.0	21.22	4.04	25.39	4.97	29.41	5.99	31.50	6.54	33.59	7.12	37.61	8.35	41.78	9.67
	29.0	21.22	4.29	25.39	5.27	29.41	6.37	31.50	6.97	33.59	7.58	37.61	8.90	41.78	10.34
	31.0	21.22	4.53	25.39	5.59	29.41	6.78	31.50	7.41	33.59	8.07	37.61	9.49	41.78	11.02
	33.0	21.22	4.82	25.39	5.95	29.41	7.22	31.50	7.88	33.59	8.60	37.61	10.11	41.78	11.75
	35.0	21.22	5.10	25.39	6.31	29.41	7.65	31.50	8.39	33.59	9.15	37.61	10.77	41.78	12.53
	37.0	21.22	5.39	25.39	6.69	29.41	8.14	31.50	8.90	33.59	9.73	37.61	11.47	41.78	13.34
	39.0	21.22	5.71	25.39	7.09	29.41	8.64	31.50	9.47	33.59	10.34	37.61	12.19	41.78	14.21
	42.0	21.22	6.04	25.39	7.42	29.41	8.97	31.50	9.89	33.59	10.76	37.61	12.86	41.78	15.05
	44.0	21.22	6.44	25.39	7.84	29.41	9.25	31.50	10.31	33.59	11.17	37.61	13.45	41.78	15.55
	46.0	21.22	6.73	25.39	8.18	29.41	9.64	31.50	10.64	33.59	11.51	37.61	13.87	41.78	15.89
60%	10.0	18.16	2.93	21.70	3.44	25.23	3.99	27.00	4.27	28.77	4.55	32.30	5.16	35.84	5.78
	12.0	18.16	2.99	21.70	3.49	25.23	4.06	27.00	4.35	28.77	4.63	32.30	5.25	35.84	5.88
	14.0	18.16	3.02	21.70	3.55	25.23	4.12	27.00	4.42	28.77	4.72	32.30	5.35	35.84	5.99
	16.0	18.16	3.06	21.70	3.61	25.23	4.19	27.00	4.50	28.77	4.80	32.30	5.44	35.84	6.10
	18.0	18.16	3.12	21.70	3.66	25.23	4.27	27.00	4.57	28.77	4.89	32.30	5.54	35.84	6.22
	20.0	18.16	3.15	21.70	3.74	25.23	4.35	27.00	4.67	28.77	4.99	32.30	5.65	35.84	6.35
	21.0	18.16	3.19	21.70	3.76	25.23	4.38	27.00	4.70	28.77	5.03	32.30	5.71	35.84	6.40
	23.0	18.16	3.23	21.70	3.84	25.23	4.46	27.00	4.80	28.77	5.12	32.30	5.93	35.84	6.82
	25.0	18.16	3.29	21.70	3.89	25.23	4.63	27.00	5.03	28.77	5.44	32.30	6.33	35.84	7.27
	27.0	18.16	3.42	21.70	4.14	25.23	4.93	27.00	5.37	28.77	5.80	32.30	6.74	35.84	7.76
	29.0	18.16	3.61	21.70	4.38	25.23	5.25	27.00	5.71	28.77	6.18	32.30	7.20	35.84	8.29
	31.0	18.16	3.84	21.70	4.65	25.23	5.57	27.00	6.06	28.77	6.57	32.30	7.65	35.84	8.82
	33.0	18.16	4.04	21.70	4.93	25.23	5.91	27.00	6.44	28.77	6.99	32.30	8.14	35.84	9.41
	35.0	18.16	4.29	21.70	5.23	25.23	6.27	27.00	6.84	28.77	7.42	32.30	8.67	35.84	10.01
	37.0	18.16	4.53	21.70	5.54	25.23	6.65	27.00	7.25	28.77	7.88	32.30	9.22	35.84	10.66
	39.0	18.16	4.78	21.70	5.86	25.23	7.05	27.00	7.69	28.77	8.37	32.30	9.79	35.84	11.34
	42.0	18.16	4.98	21.70	6.19	25.23	7.39	27.00	8.10	28.77	8.78	32.30	10.40	35.84	12.02
	44.0	18.16	5.19	21.70	6.54	25.23	7.73	27.00	8.37	28.77	9.18	32.30	10.96	35.84	12.70
	46.0	18.16	5.46	21.70	6.84	25.23	8.00	27.00	8.71	28.77	9.67	32.30	11.36	35.84	13.39

Capacity Index (%)	Outdoor Temp. (°CDB)	Indoor temperature (°C WB)													
		20.8 / 14.0		23.3 / 16.0		25.8 / 18.0		27.0 / 19.0		28.2 / 20.0		30.7 / 22.0		32.0 / 24.0	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
50%	10.0	15.19	2.53	18.16	2.93	21.05	3.34	22.50	3.57	23.95	3.78	26.84	4.25	29.89	4.74
	12.0	15.19	2.55	18.16	2.97	21.05	3.40	22.50	3.61	23.95	3.85	26.84	4.33	29.89	4.82
	14.0	15.19	2.59	18.16	3.00	21.05	3.44	22.50	3.68	23.95	3.91	26.84	4.40	29.89	4.91
	16.0	15.19	2.63	18.16	3.04	21.05	3.50	22.50	3.74	23.95	3.97	26.84	4.48	29.89	4.99
	18.0	15.19	2.66	18.16	3.10	21.05	3.55	22.50	3.80	23.95	4.04	26.84	4.55	29.89	5.08
	20.0	15.19	2.70	18.16	3.14	21.05	3.61	22.50	3.85	23.95	4.12	26.84	4.63	29.89	5.18
	21.0	15.19	2.72	18.16	3.17	21.05	3.65	22.50	3.89	23.95	4.16	26.84	4.69	29.89	5.23
	23.0	15.19	2.76	18.16	3.21	21.05	3.70	22.50	3.97	23.95	4.23	26.84	4.76	29.89	5.35
	25.0	15.19	2.80	18.16	3.27	21.05	3.78	22.50	4.04	23.95	4.36	26.84	5.01	29.89	5.71
	27.0	15.19	2.85	18.16	3.40	21.05	3.99	22.50	4.31	23.95	4.63	26.84	5.33	29.89	6.08
	29.0	15.19	3.00	18.16	3.59	21.05	4.23	22.50	4.57	23.95	4.93	26.84	5.67	29.89	6.48
	31.0	15.19	3.17	18.16	3.80	21.05	4.48	22.50	4.86	23.95	5.23	26.84	6.03	29.89	6.90
	33.0	15.19	3.36	18.16	4.02	21.05	4.76	22.50	5.14	23.95	5.55	26.84	6.40	29.89	7.33
	35.0	15.19	3.55	18.16	4.25	21.05	5.03	22.50	5.44	23.95	5.88	26.84	6.80	29.89	7.78
	37.0	15.19	3.74	18.16	4.50	21.05	5.33	22.50	5.76	23.95	6.23	26.84	7.22	29.89	8.27
	39.0	15.19	3.95	18.16	4.74	21.05	5.63	22.50	6.10	23.95	6.61	26.84	7.65	29.89	8.79
	42.0	15.19	4.17	18.16	5.01	21.05	5.90	22.50	6.48	23.95	6.99	26.84	8.20	29.89	9.33
	44.0	15.19	4.38	18.16	5.29	21.05	6.17	22.50	6.86	23.95	7.16	26.84	8.74	29.89	9.87
	46.0	15.19	4.58	18.16	5.56	21.05	6.45	22.50	7.19	23.95	7.37	26.84	9.28	29.89	10.42

Note:

- *is shown as reference.*
- *In cooling mode, avoid the outdoor air temperature range from 42-46°C, when selecting the models.*
- *The above talbe shows the average value of conditions may operate.*
- *It is recommended to use capacity index less than 130%.*

Heating Mode: 4TVH0155

Table 17

TC: Total Capacity (kW) **WB:** Wet-bulb Temperature **DB:** Dry-bulb Temperature **PI:** Power Input (kW)

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
130%	-19.8	-20	32.38	9.04	32.22	9.67	32.07	10.32	32.07	10.63	31.91	10.95	31.91	11.59
	-18.8	-19	32.86	9.24	32.70	9.87	32.70	10.50	32.54	10.81	32.54	11.11	32.38	11.74
	-16.7	-17	34.13	9.67	33.97	10.27	33.81	10.88	33.81	11.18	33.81	11.48	33.65	12.08
	-13.7	-15	35.55	10.12	35.40	10.70	35.24	11.28	35.24	11.56	35.08	11.86	35.08	12.44
	-11 .8	-13	36.99	10.56	36.99	11.13	36.83	11.68	36.67	11.96	36.67	12.24	36.51	12.79
	-9.8	-11	38.73	11 .03	38.57	11.56	38.41	12.09	38.41	12.36	38.41	12.62	38.25	13.16
	-9.5	-10	39.68	11 .26	39.53	11.78	39.37	12.29	39.37	12.56	39.21	12.81	39.21	13.32
	-8.5	-9.1	40.47	11 .46	40.32	11.96	40.32	12.47	40.16	12.72	40.16	12.97	40.00	13.49
	-7	-7.6	41.91	11 .79	41.91	12.29	41.75	12.77	41.75	13.02	41.59	13.25	41.43	13.75
	-5	-5.6	44.13	12.24	43.97	12.71	43.81	13.17	43.81	13.40	43.65	13.62	43.65	14.09
	-3	-3.7	46.19	12.64	46.03	13.09	46.03	13.52	45.87	13.75	45.87	13.97	45.71	14.40
	0	-0.7	49.84	13.25	49.84	13.67	49.68	14.07	49.68	14.22	49.52	14.48	49.52	14.88
	3	2.2	53.81	13.80	53.65	14.19	53.49	14.57	53.49	14.75	53.49	14.95	53.33	15.32
	5	4.1	56.51	14.15	56.35	14.52	56.35	14.87	56.19	15.05	56.19	15.23	56.03	15.58
	7	6	59.36	14.49	59.21	14.82	59.21	15.17	59.05	15.33	59.05	15.50	56.67	14.88
	9	7.9	62.38	14.78	62.22	15.12	62.22	15.43	62.06	15.60	60.79	15.27	56.67	13.99
	11	9.8	65.55	15.08	65.40	15.38	65.08	15.58	62.86	14.97	60.79	14.35	56.67	13.17
	13	11.8	69.04	15.36	68.89	15.66	65.08	14.60	62.86	14.02	60.79	13.47	56.67	12.36
	15	13.7	72.38	15.63	69.20	14.83	65.08	13.75	62.86	13.22	60.79	12.69	56.67	11.66
120%	-19.8	-20	32.22	9.90	32.06	10.48	31.90	11.08	31.90	11.36	31.90	11.66	31.75	12.26
	-18.8	-19	32.70	10.08	32.54	10.66	32.54	11.25	32.38	11.53	32.38	11.83	32.22	12 .41
	-16.7	-17	33.97	10.48	33.81	11.05	33.60	11.59	33.65	11.88	33.65	12.16	33.49	12.71
	-13.7	-15	35.40	10.90	35.24	11.43	35.08	11.96	35.08	12.24	35.08	12.51	34.92	13.04
	-11 .8	-13	36.83	11 .31	36.83	11.83	36.67	12.34	36.67	12.61	36.51	12.86	36.51	13.37
	-9.8	-11	38.57	11 .74	38.41	12.23	38.41	12.72	38.25	12.97	38.25	13.21	38.10	13.70
	-9.5	-10	39.53	11 .96	39.37	12.44	39.21	12.91	39.21	13.16	39.21	13.39	39.05	13.87
	-8.5	-9.1	40.32	12.14	40.16	12.61	40.16	13.07	40.00	13.31	40.00	13.55	39.84	14.02
	-7	-7.6	41.75	12.46	41.75	12.91	41.59	13.35	41.59	13.59	41.43	13.80	41.43	14.25
	-5	-5.6	43.97	12.86	43.81	13.29	43.65	13.72	43.65	13.94	43.65	14.15	43.50	14.57
	-3	-3.7	46.04	13.24	46.04	13.65	45.88	14.05	45.88	14.25	45.72	14.47	45.72	14.87
	0	-0.7	49.68	13.80	49.68	14.19	49.53	14.55	49.53	14.75	49.37	14.93	49.37	15.32
	3	2.2	53.65	14.32	53.49	14.67	53.49	15.02	53.33	15.20	53.33	15.36	52.22	15.28
	5	4.1	56.35	14.63	56.19	14.97	56.19	15.30	56.03	15.46	56.03	15.63	52.22	14.35
	7	6	59.21	14.93	59.21	15.25	59.05	15.56	58.10	15.35	56.19	14.72	52.22	13.51
	9	7.9	62.23	15.23	62.07	15.53	60.00	15.02	58.10	14.42	56.19	13.84	52.22	12.71
	11	9.8	65.40	15.50	63.81	15.23	60.00	14.12	58.10	13.57	56.19	13.02	52.22	11.98
	13	11.8	67.78	15.35	63.81	14.28	60.00	13.24	58.10	12.74	56.19	12.24	52.22	11.26
	15	13.7	67.78	14.45	63.81	13.46	60.00	12.49	58.10	12.01	56.19	11.54	52.22	10.63

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
110%	-19.8	-20	32.06	10.76	31.91	11.29	31.75	11.84	31.75	12.11	31.76	12.38	31.59	12.92
	-18.8	-19	32.54	10.93	32.38	11.46	32.38	11.99	32.38	12.26	32.22	12.52	32.22	13.06
	-16.7	-17	33.81	11.29	33.65	11.81	34.12	12.33	33.49	12.57	33.49	12.84	33.33	13.34
	-13.7	-15	35.24	11 .68	35.09	12.18	34.92	12.66	34.92	12.91	34.92	13.16	34.76	13.64
	-11 .8	-13	36.67	12.08	36.67	12.54	36.51	13.01	36.51	13.24	36.35	13.47	36.35	13.95
	-9.8	-11	38.41	12.46	38.25	12.91	38.25	13.36	38.09	13.59	38.09	13.80	38.09	14.25
	-9.5	-10	39.37	12.66	39.21	13.09	39.05	13.54	39.05	13.75	39.05	13.97	38.89	14.40
	-8.5	-9.1	40.16	12.82	40.00	13.26	40.00	13.69	39.84	13.90	39.84	14.12	39.84	12.87
	-7	-7.6	41.59	13.12	41.59	13.52	41.43	13.94	41.43	14.15	41.43	14.35	41 .27	14.77
	-5	-5.6	43.81	13.49	43.65	13.89	43.49	14.27	43.49	14.47	43.49	14.67	43.33	15.07
	-3	-3.7	45.88	13.84	45.88	14.20	45.72	14.58	45.72	14.77	45.56	14.95	45.56	15.33
	0	-0.7	49.52	14.35	49.52	14.70	49.37	15.05	49.37	15.22	49.37	15.40	47.94	15.10
	3	2.2	53.49	14.83	53.33	15.15	53.33	15.46	53.17	15.61	51.43	14.98	47.94	13.74
	5	4.1	56.19	15.12	56.19	15.43	55.08	15.28	53.17	14.67	51.43	14.09	47.94	12.92
	7	6	59.05	15.40	58.57	15.50	55.08	14.35	53.17	13.79	51.43	13.24	47.94	12 .16
	9	7.9	62.06	15.65	58.57	14.57	55.08	13.50	53.17	12.97	51.43	12.46	47.94	11 .46
	11	9.8	62.06	14.72	58.57	13.70	55.08	12.71	53.17	12.23	51.43	11.74	47.94	10.81
	13	11.8	62.06	13.80	58.57	12.86	55.08	11.94	53.17	11.49	51.43	11.05	47.94	10.18
	15	13.7	62.06	12.26	58.57	12.13	55.08	11.28	53.17	10.85	51.43	10.45	47.94	9.63
100%	-19.8	-20	31.91	11.63	31.75	12.11	31.75	12.61	31.59	12.86	31.59	13.09	31.43	13.59
	-18.8	-19	32.38	11.78	32.38	12.26	32.22	12.74	32.22	12.99	32.07	13.24	32.07	13.72
	-16.7	-17	33.65	12 .11	33.49	12.57	33.49	13.04	33.34	13.27	33.34	13.50	33.34	13.97
	-13.7	-15	35.08	12.46	34.92	12.91	34.76	13.36	34.76	13.59	34.76	13.80	34.61	14.25
	-11 .8	-13	36.51	12.82	36.51	13.24	36.35	13.67	36.35	13.89	36.35	14.10	36.19	14.53
	-9.8	-11	38.26	13.17	38.10	13.59	38.10	13.99	38.10	14.20	37.94	14.40	37.94	14.80
	-9.5	-10	39.21	13.36	39.05	13.75	39.05	14.15	38.89	14.35	38.89	14.55	38.73	14.95
	-8.5	-9.1	40.00	13.50	39.84	13.90	39.84	14.29	39.84	14.48	39.69	14.68	39.69	15.07
	-7	-7.6	41 .43	13.77	41.43	14.15	41.27	14.52	41.27	14.72	41.27	14.90	41.11	15.28
	-5	-5.6	43.65	14.12	43.49	14.47	43.49	14.83	43.34	15.00	43.34	15.18	43.18	15.55
	-3	-3.7	45.72	14.43	45.72	13.11	45.56	15.12	45.56	15.28	45.56	15.45	43.65	14.80
	0	-0.7	49.37	14.90	49.37	15.21	49.21	15.53	48.42	15.28	46.83	14.65	43.65	13.44
	3	2.2	53.34	15.33	53.18	15.61	50.00	14.45	48.42	13.89	46.83	13.34	43.65	12.24
	5	4.1	56.03	15.61	53.18	14.67	50.00	13.59	48.42	13.07	46.83	12.56	43.65	11.54
	7	6	56.35	14.82	53.18	13.79	50.00	12.79	48.42	12.31	46.83	11.83	43.65	10.88
	9	7.9	56.35	13.92	53.18	12.97	50.00	12.04	48.42	11.44	46.83	11.15	43.65	10.27
	11	9.8	56.35	13.11	53.18	12.22	50.00	11.36	48.42	10.93	46.83	10.51	43.65	9.70
	13	11.8	56.35	12.31	53.18	11.49	50.00	10.70	48.42	10.30	46.83	9.92	43.65	9.15
	15	13.7	56.35	11.61	53.18	10.85	50.00	10.10	48.42	9.73	46.83	9.37	43.65	8.67

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
90%	-19.8	-20	31.69	12.49	31.53	12.92	31.53	13.37	31.37	13.59	31.37	13.82	31.37	14.25
	-18.8	-19	32.17	12.62	32.17	13.07	32.01	13.50	32.01	13.72	32.01	13.94	31.85	14.37
	-16.7	-17	33.44	12.94	33.27	13.36	33.27	13.77	33.27	13.99	33.12	14.19	33.12	14.60
	-13.7	-15	34.86	13.25	34.70	13.65	34.70	14.05	34.54	14.25	34.54	14.45	34.54	14.85
	-11 .8	-13	36.28	13.57	36.28	13.95	36.13	14.33	36.13	14.53	36.13	14.72	35.97	15.10
	-9.8	-11	38.03	13.89	38.03	14.25	37.87	14.62	37.87	14.80	37.87	15.00	37.71	15.36
	-9.5	-10	38.98	14.05	38.82	14.42	38.82	14.77	38.66	14.95	38.66	15.13	38.66	15.48
	-8.5	-9.1	39.77	14.20	39.77	14.55	39.61	14.90	39.61	15.07	39.61	15.25	39.14	15.40
	-7	-7.6	41.20	14.43	41.20	14.77	41.04	15.11	41.04	15.28	41.04	15.45	39.14	14.70
	-5	-5.6	43.42	14.75	43.26	15.07	43.26	15.38	43.10	15.55	41.99	15.07	39.14	13.82
	-3	-3.7	45.48	15.03	45.48	15.33	45.00	15.40	43.42	14.78	41.99	14.19	39.14	13.02
	0	-0.7	49.28	15.46	47.85	15.08	45.00	13.97	43.42	13.42	41.99	12.89	39.14	11.84
	3	2.2	50.71	14.73	47.85	13.72	45.00	12.72	43.42	12.24	41.99	11.76	39.14	10.83
	5	4.1	50.71	13.85	47.85	12.91	45.00	11.99	43.42	11.53	41.99	11.10	39.14	10.22
	7	6	50.71	13.02	47.85	12.16	45.00	11.29	43.42	10.88	41.99	10.46	39.14	9.65
	9	7.9	50.71	12.28	47.85	11 .44	45.00	10.65	43.42	10.26	41.99	9.88	39.14	9.12
	11	9.8	50.71	11.56	47.85	10.80	45.00	10.07	43.42	9.70	41.99	9.34	39.14	8.64
	13	11.8	50.71	10.88	47.85	10.18	45.00	9.48	43.42	9.15	41.99	8.82	39.14	8.16
	15	13.7	50.71	10.28	47.85	9.62	45.00	8.99	43.42	8.67	41.99	8.35	39.14	7.74
80%	-19.8	-20	31.59	13.35	31.43	13.74	31.43	14.14	31.43	14.33	31.27	14.53	31 .27	14.92
	-18.8	-19	32.06	13.47	32.06	13.87	31.90	14.25	31.90	14.45	31 .90	14.63	31 .75	15.03
	-16.7	-17	33.33	13.75	33.18	14.12	33.18	14.50	33.18	14.68	33.18	14.87	33.02	15.23
	-13.7	-15	34.76	14.04	34.60	14.38	34.60	14.75	34.60	14.92	34.44	15.10	34.44	15.46
	-11 .8	-13	36.19	14.32	36.19	14.67	36.03	15.00	36.03	15.16	36.03	15.35	34.92	14.93
	-9.8	-11	37.94	14.60	37.94	14.93	37.78	15.26	37.78	15.41	37.46	15.38	34.92	14.10
	-9.5	-10	38.89	14.75	38.72	15.06	38.73	15.38	38.73	15.55	37.46	14.93	34.92	13.69
	-8.5	-9.1	39.68	14.88	36.88	15.20	39.52	15.50	38.73	15.15	37.46	14.53	34.92	13.32
	-7	-7.6	41 .11	15 .10	41 .11	15.40	40.00	15.06	38.73	14.47	37.46	13.89	34.92	12.74
	-5	-5.6	43.33	15.36	42.54	15.28	40.00	14.15	38.73	13.60	37.46	13.05	34.92	11.99
	-3	-3.7	45.08	15.45	42.54	14.38	40.00	13.32	38.73	12.82	37.46	12.31	34.92	11.33
	0	-0.7	45.08	14.02	42.54	13.05	40.00	12.13	38.73	11.68	37.46	11 .21	34.92	10.33
	3	2.2	45.08	12.77	42.54	11.91	40.00	11.08	38.73	10.66	37.46	10.26	34.92	9.47
	5	4.1	45.08	12.03	42.54	11 .23	40.00	10.45	38.73	10.07	37.46	9.70	34.92	8.95
	7	6	45.08	11.33	42.54	10.60	40.00	9.87	38.73	9.52	37.46	9.17	34.92	8.47
	9	7.9	45.08	10.70	42.54	10.00	40.00	9.32	38.73	8.99	37.46	8.67	34.92	8.02
	11	9.8	45.08	10.10	42.54	9.45	40.00	8.82	38.73	8.50	37.46	8.20	34.92	7.61
	13	11.8	45.08	9.52	42.54	8.92	40.00	8.34	38.73	8.04	37.46	7.76	34.92	7.19
	15	13.7	45.08	9.00	42.54	8.45	40.00	7.91	38.73	7.62	37.46	7.36	34.92	6.84

Specification & Performance

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
70%	-19.8	-20	31.36	14.22	31.20	14.55	31.20	14.90	31.20	15.06	31.20	15.25	30.41	15.08
	-18.8	-19	31.83	14.33	31.83	14.67	31.68	15.00	31.68	15.16	31.68	15.35	30.41	14.77
	-16.7	-17	33.10	14.57	33.10	14.90	32.94	15.21	32.94	15.38	32.62	13.70	30.41	14.09
	-13.7	-15	34.52	14.82	34.37	15.13	34.37	15.45	33.73	15.21	32.62	14.60	30.41	13.39
	-11 .8	-13	35.95	15.06	35.95	15.36	35.00	15.00	33.73	14.42	32.62	13.84	30.41	12.69
	-9.8	-11	37.69	15.31	37.22	15.30	35.00	14.17	33.73	13.62	32.62	13.07	30.41	12.01
	-9.5	-10	38.64	15.45	37.22	14.85	35.00	13.75	33.73	13.22	32.62	12.71	30.41	11.68
	-8.5	-9.1	39.43	15.53	37.22	14.45	35.00	13.39	33.73	12.87	32.62	12.37	30.41	11.38
	-7	-7.6	39.43	14.83	37.22	13.80	35.00	12.81	33.73	12.32	32.62	11.84	30.41	10.90
	-5	-5.6	39.43	13.94	37.22	12.99	35.00	12.06	33.73	11.59	32.62	13.70	30.41	10.28
	-3	-3.7	39.43	13.12	37.22	12.24	35.00	11.38	33.73	10.95	32.62	10.53	30.41	9.72
	0	-0.7	39.43	11.94	37.22	11.16	35.00	10.38	33.73	10.00	32.62	9.63	30.41	8.90
	3	2.2	39.43	10.91	37.22	10.22	35.00	9.52	33.73	9.17	32.62	8.84	30.41	8.17
	5	4.1	39.43	10.30	37.22	9.63	35.00	9.00	33.73	8.67	32.62	8.35	30.41	7.74
	7	6	39.43	9.73	37.22	9.12	35.00	8.50	33.73	8.20	32.62	7.92	30.41	7.34
	9	7.9	39.43	9.20	37.22	8.62	35.00	8.06	33.73	7.77	32.62	7.51	30.41	6.96
	11	9.8	39.43	8.70	37.22	8.16	35.00	7.64	33.73	7.37	32.62	7.13	30.41	6.61
	13	11.8	39.43	8.22	37.22	7.72	35.00	7.23	33.73	6.99	32.62	6.74	30.41	6.28
	15	13.7	39.43	7.79	37.22	7.32	35.00	6.86	33.73	6.64	32.62	6.41	30.41	5.98
60%	-19.8	-20	31.27	15.08	31 .11	15.36	30.00	14.78	29.05	14.20	28.10	13.64	26.19	12.51
	-18.8	-19	31.75	15.18	31.75	15.46	30.00	14.47	29.05	13.90	28.10	13.34	26.19	12.24
	-16.7	-17	33.02	15.38	31.91	14.90	30.00	13.80	29.05	13.27	28.10	12.74	26.19	11.71
	-13.7	-15	33.81	15.21	31.91	14.15	30.00	13.12	29.05	12.62	28.10	12.12	26.19	11.14
	-11 .8	-13	33.81	14.40	31.91	13.40	30.00	12.44	29.05	11.98	28.10	11.51	26.19	10.65
	-9.8	-11	33.81	13.60	31.91	12.67	30.00	11.78	29.05	11.33	28.10	10.90	26.19	10.05
	-9.5	-10	33.81	13.22	31.91	12.32	30.00	11.44	29.05	11.03	28.10	10.60	26.19	9.77
	-8.5	-9.1	33.81	12.87	31.91	12.01	30.00	11.16	29.05	10.75	28.10	10.33	26.19	9.53
	-7	-7.6	33.81	12.31	31.91	11.49	30.00	10.68	29.05	10.30	28.10	9.90	26.19	9.15
	-5	-5.6	33.81	11.59	31.91	10.83	30.00	10.08	29.05	9.72	28.10	9.35	26.19	8.65
	-3	-3.7	33.81	10.95	31.91	10.23	30.00	9.53	29.05	9.20	28.10	8.85	26.19	8.19
	0	-0.7	33.81	10.00	31.91	9.37	30.00	8.74	29.05	8.44	28.10	8.12	26.19	7.52
	3	2.2	33.81	9.17	31.91	8.60	30.00	8.04	29.05	7.76	28.10	7.49	26.19	6.94
	5	4.1	33.81	8.67	31.91	8.14	30.00	7.61	29.05	7.36	28.10	7.09	26.19	6.59
	7	6	33.81	8.20	31.91	7.71	30.00	7.21	29.05	6.98	28.10	6.74	26.19	6.26
	9	7.9	33.81	7.77	31.91	7.31	30.00	6.84	29.05	6.63	28.10	6.39	26.19	5.96
	11	9.8	33.81	7.37	31.91	6.94	30.00	6.51	29.05	6.30	28.10	6.08	26.19	5.68
	13	11.8	33.81	6.98	31.91	6.58	30.00	6.18	29.05	5.98	28.10	5.78	26.19	5.40
	15	13.7	33.81	6.64	31.91	6.25	30.00	5.88	29.05	5.70	28.10	5.51	26.19	5.15

Capacity Index (%)	Outdoor Temp. (°C)		Indoor Temperature (°C DB)											
			16		18		20		21		22		24	
	DB	WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
50%	-19.8	-20	28.17	13.72	26.58	12.77	25.00	11.86	24.05	11.43	23.26	10.98	21.68	10.12
	-18.8	-19	28.17	13.42	26.58	12.51	25.00	11.63	24.05	11.18	23.26	10.75	21.68	9.92
	-16.7	-17	28.17	12.81	26.58	11.94	25.00	11.11	24.05	10.70	23.26	10.30	21.68	9.50
	-13.7	-15	28.17	12.19	26.58	11.38	25.00	10.58	24.05	10.20	23.26	9.82	21.68	9.07
	-11 .8	-13	28.17	11 .58	26.58	10.81	25.00	10.07	24.05	9.70	23.26	9.33	21.68	8.64
	-9.8	-11	28.17	10.96	26.58	10.25	25.00	9.55	24.05	9.20	23.26	8.87	21.68	8.20
	-9.5	-10	28.17	10.66	26.58	9.97	25.00	9.30	24.05	8.97	23.26	8.64	21.68	7.99
	-8.5	-9.1	28.17	10.40	26.58	9.73	25.00	9.07	24.05	8.75	23.26	8.44	21.68	7.81
	-7	-7.6	28.17	9.97	26.58	9.33	25.00	8.70	24.05	8.40	23.26	8.11	21.68	7.51
	-5	-5.6	28.17	9.40	26.58	8.82	25.00	8.24	24.05	7.96	23.26	7.67	21.68	7.11
	-3	-3.7	28.17	8.90	26.58	8.35	25.00	7.81	24.05	7.54	23.26	7.27	21.68	6.76
	0	-0.7	28.17	8.17	26.58	7.67	25.00	7.19	24.05	6.94	23.26	6.71	21.68	6.25
	3	2.2	28.17	7.52	26.58	7.08	25.00	6.63	24.05	6.41	23.26	6.20	21.68	5.78
	5	4.1	28.17	7.14	26.58	6.71	25.00	6.30	24.05	6.10	23.26	5.90	21.68	5.50
	7	6	28.17	6.78	26.58	6.38	25.00	6.00	24.05	5.80	23.26	5.61	21.68	5.25
	9	7.9	28.17	6.43	26.58	6.06	25.00	5.70	24.05	5.53	23.26	5.35	21.68	5.00
	11	9.8	28.17	6.11	26.58	5.76	25.00	5.43	24.05	5.27	23.26	5.10	21.68	4.77
	13	11.8	28.17	5.81	26.58	5.48	25.00	5.17	24.05	5.02	23.26	4.85	21.68	4.55
	15	13.7	28.17	5.53	26.58	5.23	25.00	4.93	24.05	4.78	23.26	4.63	21.68	4.35

Note:

- *is shown as reference.*
- *In heating mode, avoid the outdoor air temperature range from -15–20 °C, when selecting the models.*
- *The above talbe shows the average value of conditions may operate.*
- *It is recommended to use capacity index less than 130%.*

Sound Levels

Standard of testing

Figure 17

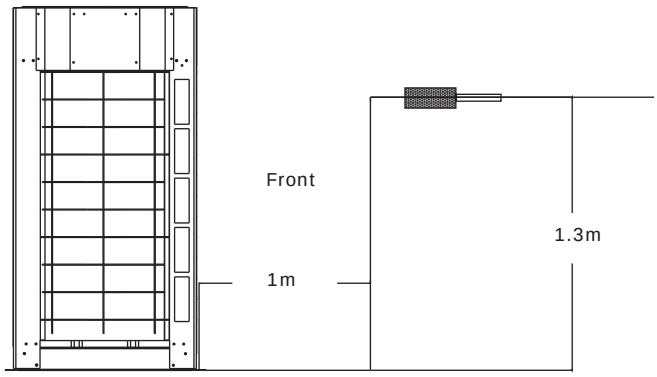
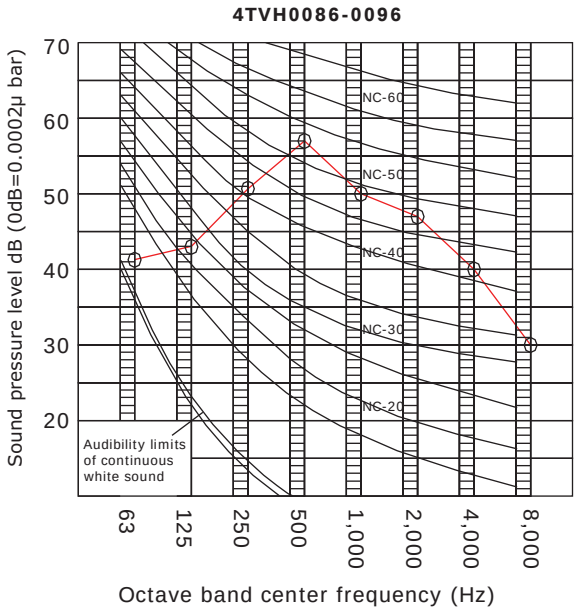


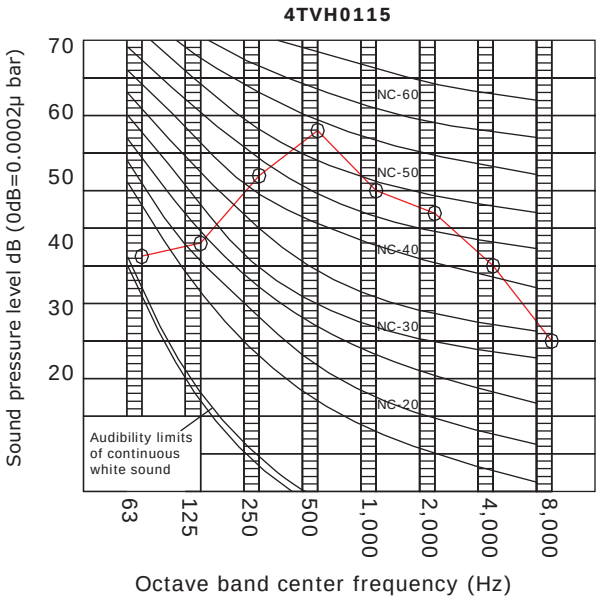
Table 18

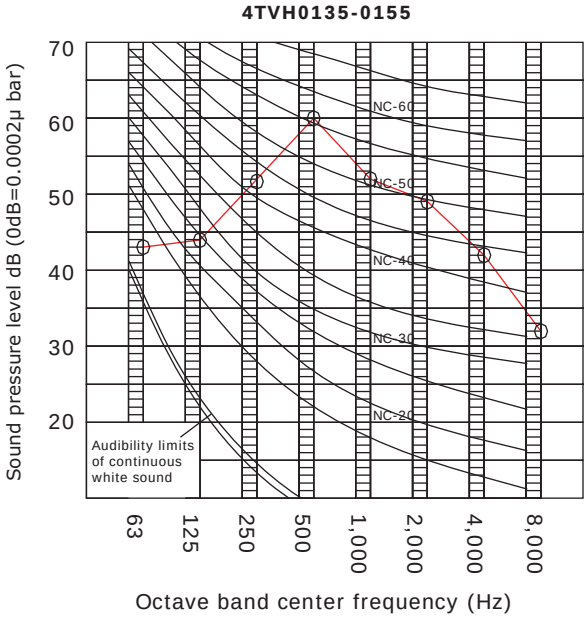
Outdoor unit	Noise level (dBA)
4TVH0086	57
4TVH0096	57
4TVH0115	58
4TVH0135	60
4TVH0155	60

Sound Curve:

Figure 18



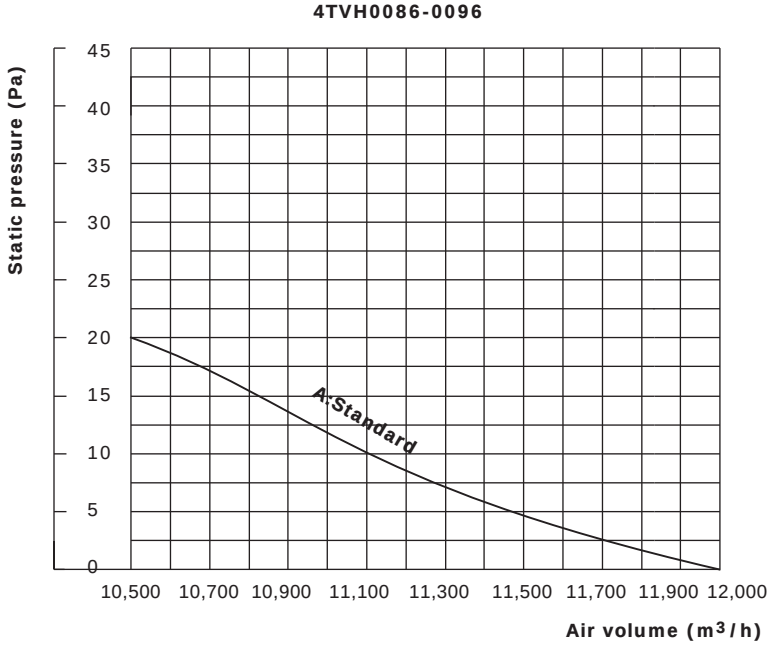



4TVH0135-0155
Sound pressure level dB (0dB=0.0002µ bar)
70
60
50
40
30
20
NC-60
NC-50
NC-40
NC-30
NC-20
Audibility limits of continuous white sound
63
125
250
500
1,000
2,000
4,000
8,000
Octave band center frequency (Hz)

Outdoor Fan Performance

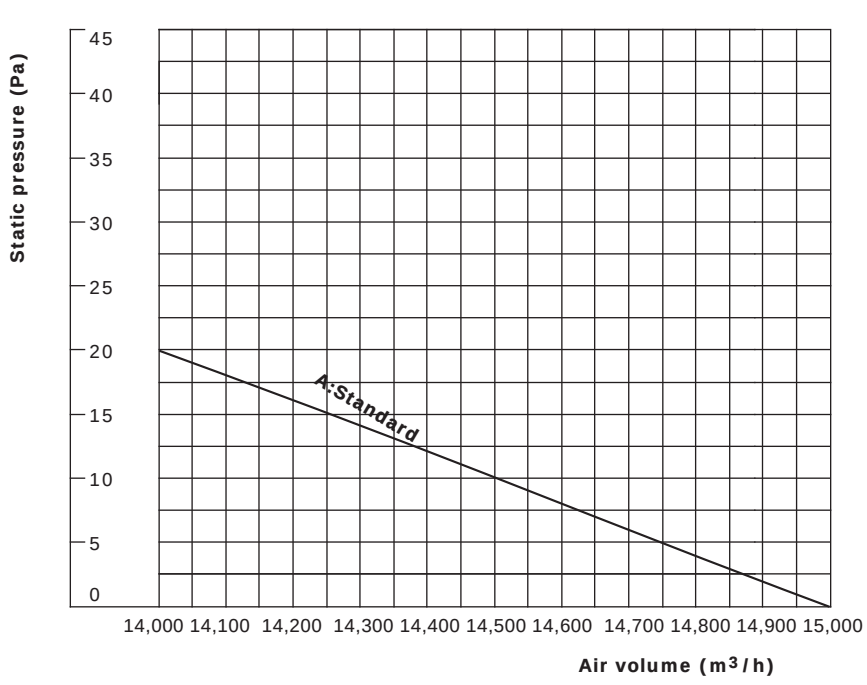
Curve diagram of static pressure, air flow volume:

Figure 19



Curve diagram of static pressure, air flow volume:

Figure 20



Accessories

Standard accessories

Table 19

No	Name	Quantity	Purpose
1	Installation manual of outdoor unit	1	/
2	Operation manual of outdoor unit	1+1	(Be sure to deliver it to the customer)
3	Operation manual of indoor unit	1+1	(Be sure to deliver it to the customer)
4	Screw bag	1	Spare
5	Straight screwdriver	1	Dialing
6	Gauge joint	1	For airtight test
7	90° elbow	2	Pipe connecting

Optional accessories

Table 20

Optional accessories	Model name	Function
Branch Joint of outdoor side	TODK002A	Distribute the refrigerant to indoor units and balance the resistence between each outdoor unit.
	TODK003A	
	TODK004A	
Branch Joint of indoor side	TRDK056A	
	TRDK112A	
	TRDK225A	
	TRDK314A	
	TRDK768A	
Outdoor controller	TOCCW001A	Monitor the outdoor operating parameter
Three phase electricity power protector	TOUCA002A	To stop the air-conditioner running in case of bad power supply such as Phase Error, Over-voltage, Under-voltage lose, phase lost and phase sequence inverse, thus protect the equipment.
Digital ammeter (WHM)	TSNEA002A	Electricity Charge monitor

Functional Parts and Safety Devices

Table 21

Item	Symbol	Name		4TVH0086AD	4TVH0096AD	4TVH0115AD
Compressor	Inverter	Inverter compressor		E405DHD-36D2Y	E405DHD-36D2Y	E405DHD-36D2Y
	FIX1	Fixed speed compressor		E605DH-59D2Y	E655DH-59D2Y	E655DH-59D2Y
	Compressor Safety OLP	Open temperature		160±5°C		
		Starting current		--/62A	--/68A	--/68A
	CCH	Crank case heater		DJRD-520A-1500-27.6W *2		
Motor and Security Devices	Motor	Fan motor	Model	WZDK750-38G-4	WZDK750-38G-4	WZDK750-38G-4 (2sets)
			Output power	750W	750W	750W*2
		Safety thermostat	On	115°C		
			Off	/		
	HP	High pressure switch		OFF:44 (±1) kg/cm^2 /ON:32 (±1) kg/cm^2		
	LP	Low pressure switch		OFF:0.3 (±1) kg/cm^2 /ON:1.0 (±1) kg/cm^2		
Temperature sensor	T3, T4	Temperature sensor (condenser outlet/ambient temperature)		25°C=10KΩ		
	Discharge thermostat	Thermostat (Inverter /Fixed discharge)		BW130°C ON: 130°C OFF: 85°C		
Pressure sensor	HPSH	High pressure sensor (discharge)		Model: YLCGQ-45CP2-7K6J10, Character: Vout=1.1603*P+0.5 (MPa)		
Functional Parts	PMV	Electronic expansion valve		VPF-32D40 Foshan Hualu		
	4-W/V	4-way valve		STF-01VN1 Foshan Hualu		
	SV	Solenoied valve		FDF2A-217-PK, etc. Zhejiang Dunan		

Item	Symbol	Name		4TVH0135AD	4TVH0155AD
Compressor	Inverter	Inverter compressor		E405DHD-36D2Y	E405DHD-36D2Y
	FIX1	Fixed speed compressor		E605DH-59D2Y	E655DH-59D2Y
	FIX2	Fixed speed compressor		E605DH-59D2Y	E655DH-59D2Y
	Compressor Safety OLP	Open temperature		160±5°C	
		Starting current		--/62A/62A	--/68A/68A
	CCH	Crank case heater		27.6W *3	
Motor and Security Devices	Motor	Fan motor	Model	WZDK750-38G-4 (2 sets)	WZDK750-38G-4 (2 sets)
			Output power	750W*2	750W*2
		Safety thermostat	On	115°C	
			Off	/	
	HP	High pressure switch		OFF:44 (±1) kg/cm^2 /ON:32 (±1) kg/cm^2	
	LP	Low pressure switch		OFF:0.3 (±1) kg/cm^2 /ON:1.0 (±1) kg/cm^2	
Temperature sensor	T3, T4	Temperature sensor (condenser outlet/ambient temperature)		25℃=10KΩ	
	Discharge thermostat	Thermostat (Inverter/Fixed discharge)		BW130°C ON:130°C OFF:85°C	
Pressure sensor	HPSH	High pressure sensor (discharge)		Model: YLCGQ-45CP2-7K6J10, Character: Vout=1.1603*P+0.5 (MPa)	
Functional Parts	PMV	Electronic expansion valve		VPF-32D40 (2 sets) Foshan Hualu	
	4-W/V	4-way valve		STF-01VN1 Foshan Hualu	
	SV	Solenoied valve		FDF2A-217-PK, etc. Zhejiang Dunan	

Part 4 Installation

Installation Introduction

Select the Refrigerant Piping for TVR™ II Modular Type

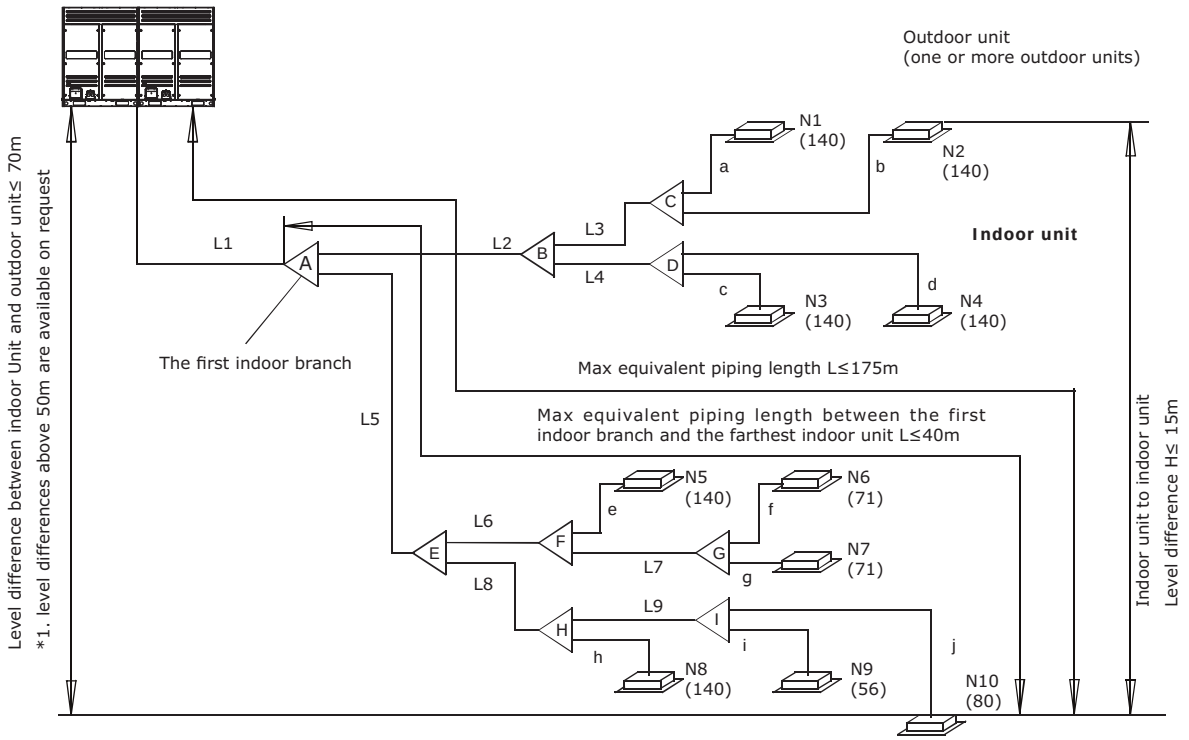
Length and drop height permitted of the refrigerant piping.

Table 1

			Permitted value		Piping
Max. allowable piping length	Total actual piping length		≤30HP	350m	L1+L2+L3+L4+L5+L6+L7+L8+L9 +a+b+c+d+e+f+j+h+i+j
			>30HP	500m	
	Actual piping length		150m		L1+L5+L8+L9+J
	Equivalent piping length		175m		
Max. allowable level difference	Equivalent piping length between the first indoor branch and the farthest indoor unit		40m		L5+L8+L9+J
	Between indoor units and out door units	Outdoor unit is above	70m (*1 Available on request)		——
		Outdoor unit is below	70m		——
	Between indoor units		15		——

Note: *Each branch equals to 0.5m pipe length.*

Figure 1

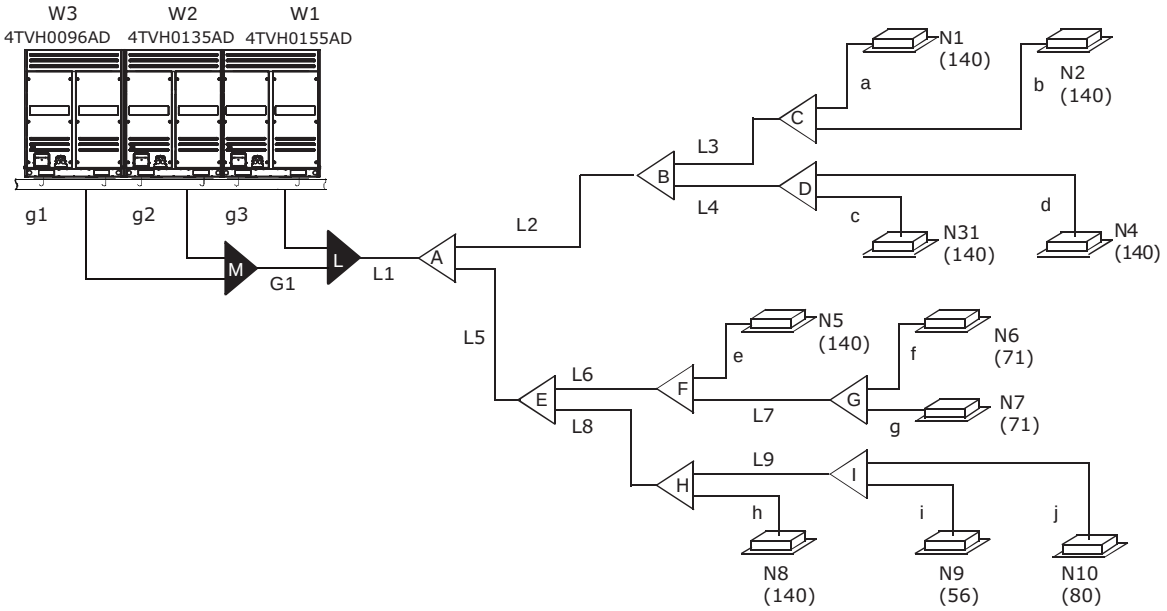


*1. level difference above 50m are not supported by default but are available on request for customized. (if the outdoor unit is above the indoor unit)

Note: *All branches must be purchased from Trane, otherwise malfunction will be caused.*

Select the refrigerant piping.

Figure 2



Note:

In the above drawing, the capacity unit of indoor side is (x100W), and the outdoor side is HP.

Table 2

Pipe name	Code (As per the Fig.34)
Main pipe	L1
Indoor unit main pipe	L2~L9
Indoor unit aux. pipe	a, b, c, d, e, f, g, h, i, j
Indoor unit branching pipe assembly	A, B, C, D, E, F, G, H, I
Outdoor unit branching pipe assembly	L, M
Outdoor unit refrigerant pipe	g1, g2, g3, G1

- Selection of the indoor unit pipes
  E.g. The pipe (a~j) in the above drawing.
  Please refer to the following table.

Table 3

The total capacity of indoor units (x100W)	When indoor unit pipe length≤10m		When indoor unit pipe length>10m	
	Gas side	Liquid side	Gas side	Liquid side
A≤45	Φ12.7mm	Φ6.4mm	Φ15.9mm	Φ9.5mm
A≤56	Φ15.9mm	Φ9.5mm	Φ19.1mm	Φ12.7mm

- Selection of the branches and indoor main pipe
  E.g. The branches (A~I) and indoor main pipe (L2~L9) in the above drawing.
  Please refer to the following table.

Table 4

Size of joint pipes for 410A indoor unit

Capacity of indoor unit (A)	Mode		
	Gas side	Liquid side	Available branching pipe
A<166	Φ19.1	Φ9.5	TRDK056A
166≤A<230	Φ22.2	Φ9.5	TRDK112A
230≤A<330	Φ22.2	Φ12.7	TRDK112A
330≤A<460	Φ28.6	Φ12.7	TRDK225A
460≤A<660	Φ28.6	Φ15.9	TRDK225A
660≤A<920	Φ34.9	Φ19.1	TRDK314A
920≤A<1350	Φ41.3	Φ19.1	TRDK768A
1350≤A	Φ44.5	Φ22.2	TRDK768A

- Selection of the main pipe (L1)
  E.g. The main pipe (L1) in the above drawing
  Please refer to the following table:

Table 5

Size of joint pipes for 410A outdoor unit

Model	When the equivalent length of all liquid pipes < 90m, the size of main pipe (mm)		
	Gas side	Liquid side	Available branching pipe
4TVH0086	Φ22.2	Φ12.7	TRDK112A
4TVH0096	Φ25.4	Φ12.7	TRDK112A
4TVH0115	Φ28.6	Φ12.7	TRDK225A
4TVH0135-0155	Φ28.6	Φ15.9	TRDK225A
4TVH0182-0211	Φ31.8	Φ15.9	TRDK225A
4TVH0231	Φ34.9	Φ15.9	TRDK314A
4TVH0251-0310	Φ34.9	Φ19.1	TRDK314A
4TVH0327-0465	Φ41.3	Φ19.1	TRDK768A
4TVH0492-0620	Φ44.5	Φ22.2	TRDK768A

Table 6

Size of joint pipes for 410A outdoor unit

Model	When the equivalent length of all liquid pipes ≥90m, the size of main pipe (mm)		
	Gas side	Liquid side	Available branching pipe
4TVH0086	Φ25.4	Φ12.7	TRDK112A
4TVH0096	Φ25.4	Φ12.7	TRDK112A
4TVH0115	Φ28.6	Φ15.9	TRDK225A
4TVH0135-0155	Φ31.8	Φ15.9	TRDK225A
4TVH0182-0211	Φ31.8	Φ19.1	TRDK225A
4TVH0231	Φ34.9	Φ19.1	TRDK314A
4TVH0251-0310	Φ38.1	Φ22.2	TRDK314A
4TVH0327-0465	Φ41.3	Φ22.2	TRDK768A
4TVH0492-0620	Φ44.5	Φ25.4	TRDK768A

Notice:

If the total indoor units' capacity is more than the total outdoor units, please select the main pipe dia. according to the bigger one.

E.g. when the total capacity of 4TVH0155+4TVH0155+4TVH0135 paralleled outdoor units is 4TVH0445, if the total pipe length is more than 90m, the pipe dia. is Φ41.3 and Φ22.2 according to the above table. While the total indoor units' capacity is 136kW, the pipe dia. is Φ44.5 and Φ22.2 according to table 4. Then, according to the principle of selecting the biggier, the main pipe dia. should be} 44.5 and Φ22.2.

- Selection of the branch (L, M) and the outdoor unit pipe (g1, g2, g3, G1)

  E.g. The branch (L, M) and outdoor unit pipe (g1, g2, g3, G1) in the above drawing.

  When there is only single outdoor unit, please refer to the following table:

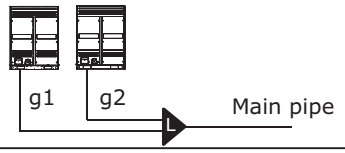
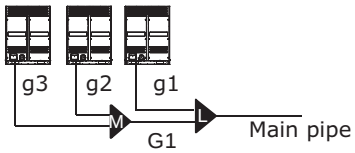
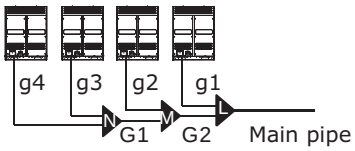
Table 7

Model	The outdoor unit pipe dlia. (mm)	
4TVH0086AD000AA	Φ25.4	Φ12.7
4TVH0096AD000AA	Φ25.4	Φ12.7
4TVH0115AD000AA	Φ31.8	Φ15.9
4TVH0140AD000AA	Φ31.8	Φ15.9
4TVH0155AD000AA	Φ31.8	Φ15.9

When the multi. outdoor units are paralleled, please refer to the following table:

Table 8

Outdoor unit multi-refrigerant pipe assembly (Illustration)

Outdoor unit Qty	Illustration
2 units	
3 units	
4 units	

Outdoor unit multi-refrigerant pipe assembly

Table 9

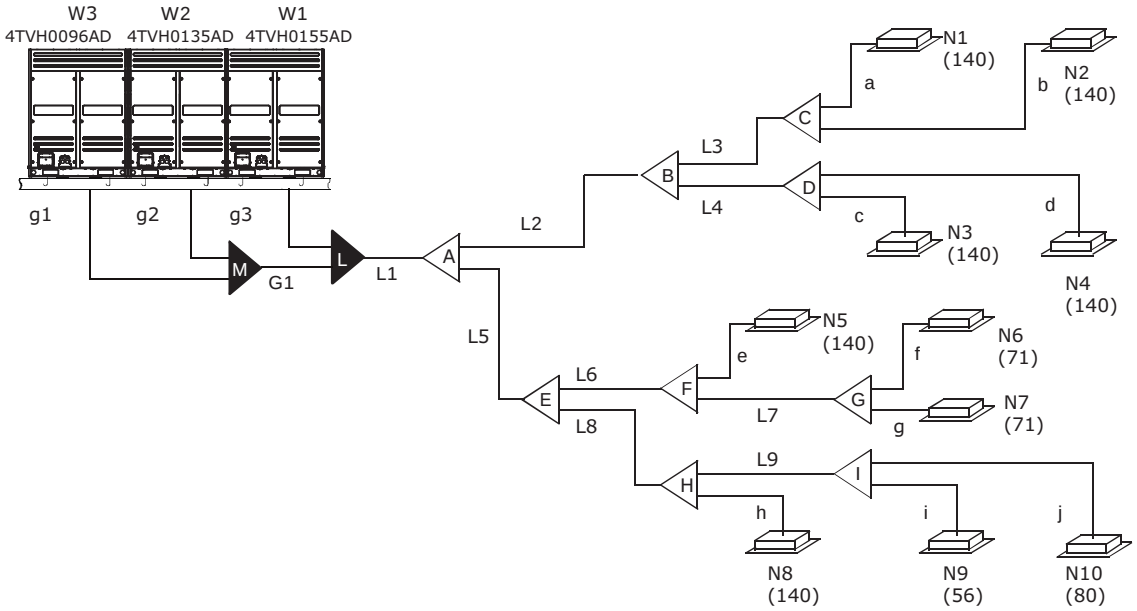
Outdoor unit Qty	Outdoor unit refrigerant pipe diameter	Parallel connect with the branching pipes	Main pipe
2 units	g1, g2: 8, 10HP: Φ25.4/12.7; 12~16HP: Φ31.8/Φ15.9	L: TODK002A	Refer to Table 5 or 6 for main pipe dimension
3 units	g1, g2, g3:8, 10HP: Φ25.4Φ/12.7; 12~16HP: Φ31.8Φ/15.9;G1: Φ38.1/Φ19.1	L+M: TODK003A	
4 units	g1, g2, g3, g4:8, 10HP: Φ25.4Φ/12.7;12~16HP: Φ31.8/Φ15.9;G1: Φ38.1/Φ19.1;G2: Φ41.3/Φ22.2	L+M+N: TODK004A	

Note:

- *The pipe assemblies in above table is special for this model, which must be purchased separately.*

Pipe selection example

Figure 3



Notice: *Suppose total equivalent pipe length surpasses 90m.*

- Select each indoor unit pipe according to the following table

Table 10

The total capacity of indoor units (x100W)	When indoor unit pipe length≤10m		When indoar unit pipe length>10m	
	Gas side	Liquid side	Gas side	Liquid side
A≤45	Φ12.7mm	Φ6.4mm	Φ15.9mm	Φ9.5mm
A≤56	Φ15.9mm	Φ9.5mm	Φ19.1mm	Φ12.7mm

- Select main pipe (L1), indoor main pipe (L2-L9), indoor branch (A-I)

Table 11

Indoor main pipe/ indoor branch	Total capacity of indoor units (x100W)	Range	Pipe dimension (Gas/Liquid)	Branch
L3/C	N1+N2=280	230≤A<330	Φ22.2/Φ12.7	TRDK112A
L4/D	N3+N4=280	230≤A<330	Φ22.2/Φ12.7	TRDK112A
L2/B	N1+……+N4=560	460≤A<660	Φ28.6/Φ15.9	TRDK225A
L7/G	N6+N7=142	A<166	Φ19.1/Φ9.5	TRDK056A
L6/F	N5+……+N7=282	230≤A<330	Φ22.2/Φ12.7	TRDK112A
L9/I	N9+N10=136	230≤A<330	Φ22.2/Φ12.7	TRDK112A
L8/H	N8+……+N10=276	230≤A<330	Φ22.2/Φ12.7	TRDK112A
L5/E	N5+……N10=558	460≤A<660	Φ28.6/Φ15.9	TRDK225A
L1/A	N1+……N10=1,118	920≤A<1,350	Φ41.3/Φ19.1	TRDK768A

- Select main pipe (L1) and outdoor unit pipe (g1-g3, G1), outdoor branch

Table 12

Main pipe / outdoor unit pipe / branch	Model	The Max.equivalent pipe length≥90m	Pipe dimension (Gas/Liquid)	Branch
		Gas Side/Liquid Side		
g1	4TVH0096	Φ25.4(Welding)/Φ12.7(Flaring Nut)	8≤W3≤10HP	/
g2	4TVH0135	Φ31.8(Welding)/15.9(Flaring Nut)	12≤W2≤16HP	/
g3	4TVH0155	Φ31.8(Welding)/15.9(Flaring Nut)	12≤W1≤16HP	/
G1	4TVH0231	Φ31.8(Welding)/Φ19.1(Welding)	Two modular combination	/
L1	4TVH0386	Φ41.3(Welding)/Φ22.2(Welding)	4TVH0327-0465	/
L+M	/	/	Three modular combination	TODK003A

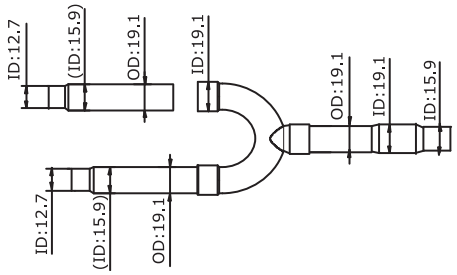
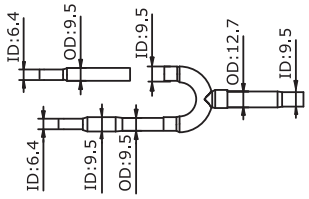
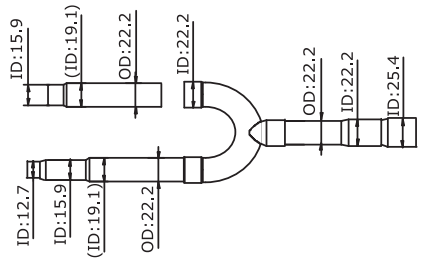
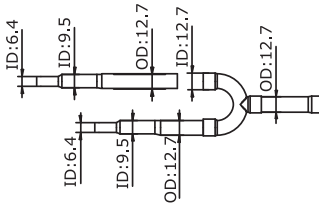
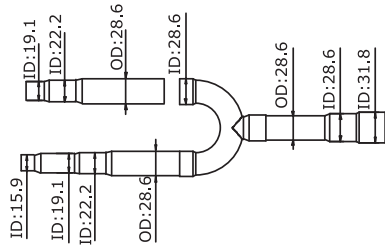
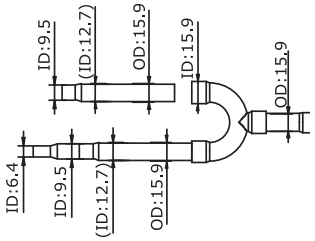
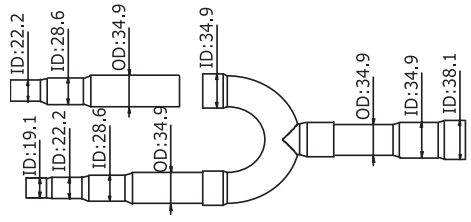
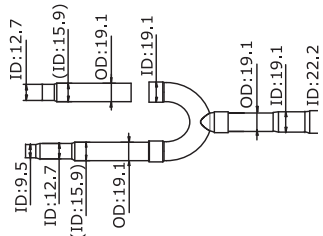
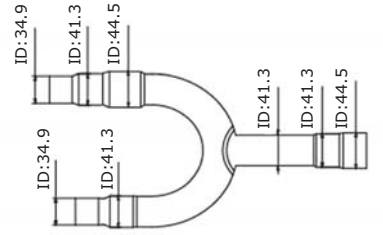
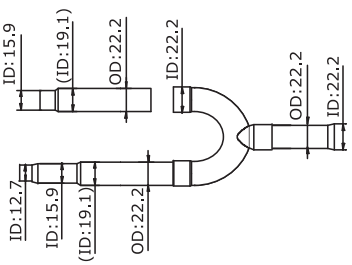
- Compare the total capacity from indoor side and outdoor side, select the main pipe dia. according to the bigger one.

  In this case, the total capacity from indoor side is 1,118kW, the corresponding main pipe dia. is Φ41.3/Φ19.1, Installation but the total capacity from outdoor side is 40HP, the corresponding main pipe is Φ41.3/Φ22.2, so the final main pipe should be Φ41.3/Φ22.2.

Branch drawing

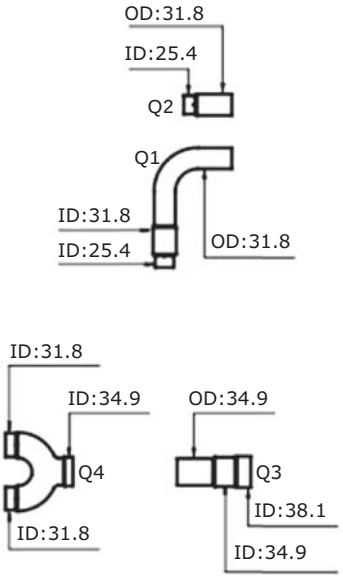
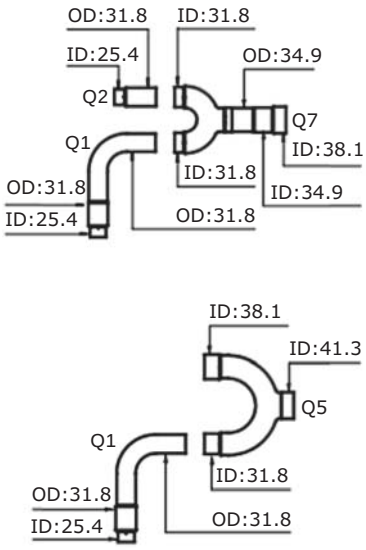
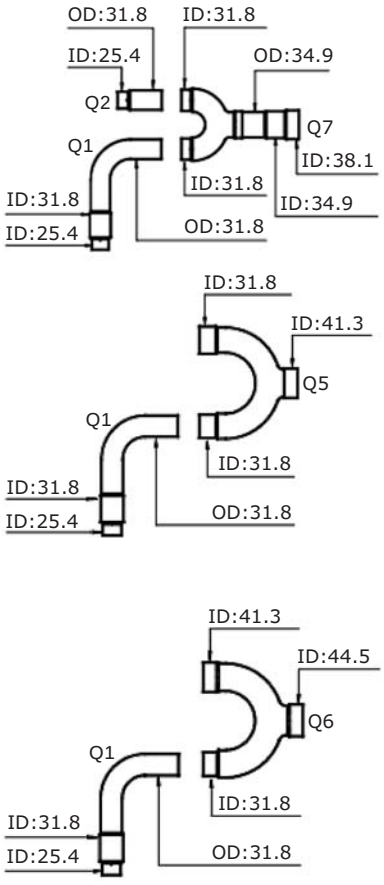
- Indoor branch drawing

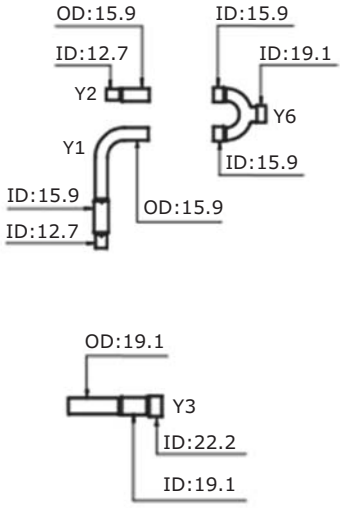
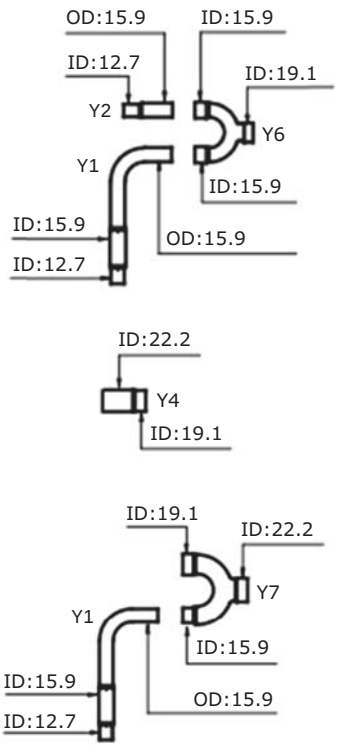
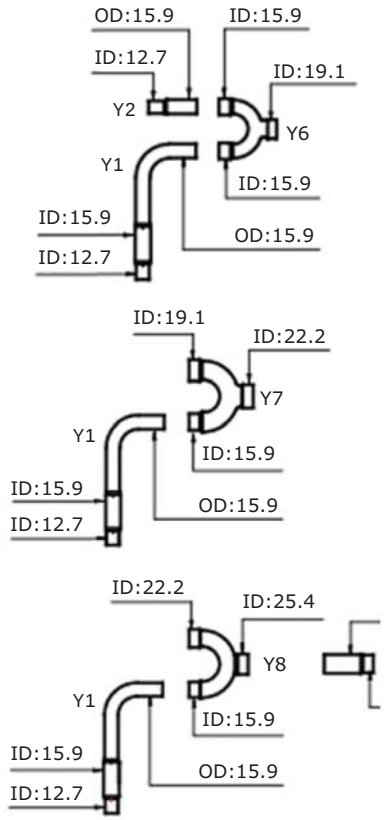
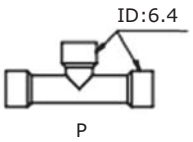
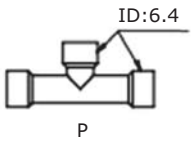
Table 13

Indoor branch	Gas side	Liquid side
TRDK056A		
TRDK112A		
TRDK225A		
TRDK314A		
TRDK768A		

- Outdoor branch drawing

Table 14

Outdoor branch	TODK002A	TODK003A	TODK004A
Gas side			

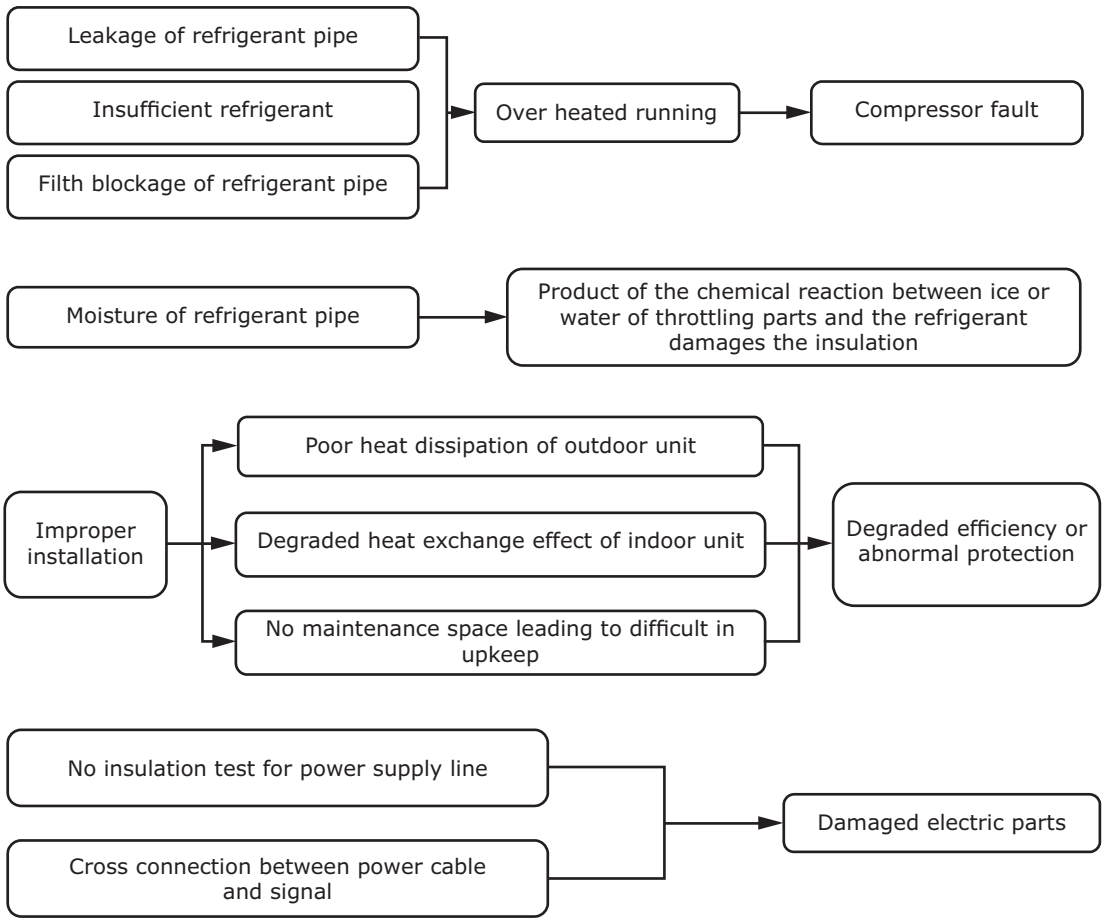
Outdoor branch	TODK002A	TODK003A	TODK004A
Liquid side			
Oil balance pipe	/		 (2 pcs)

Installation Procedure

Importance of installation operation

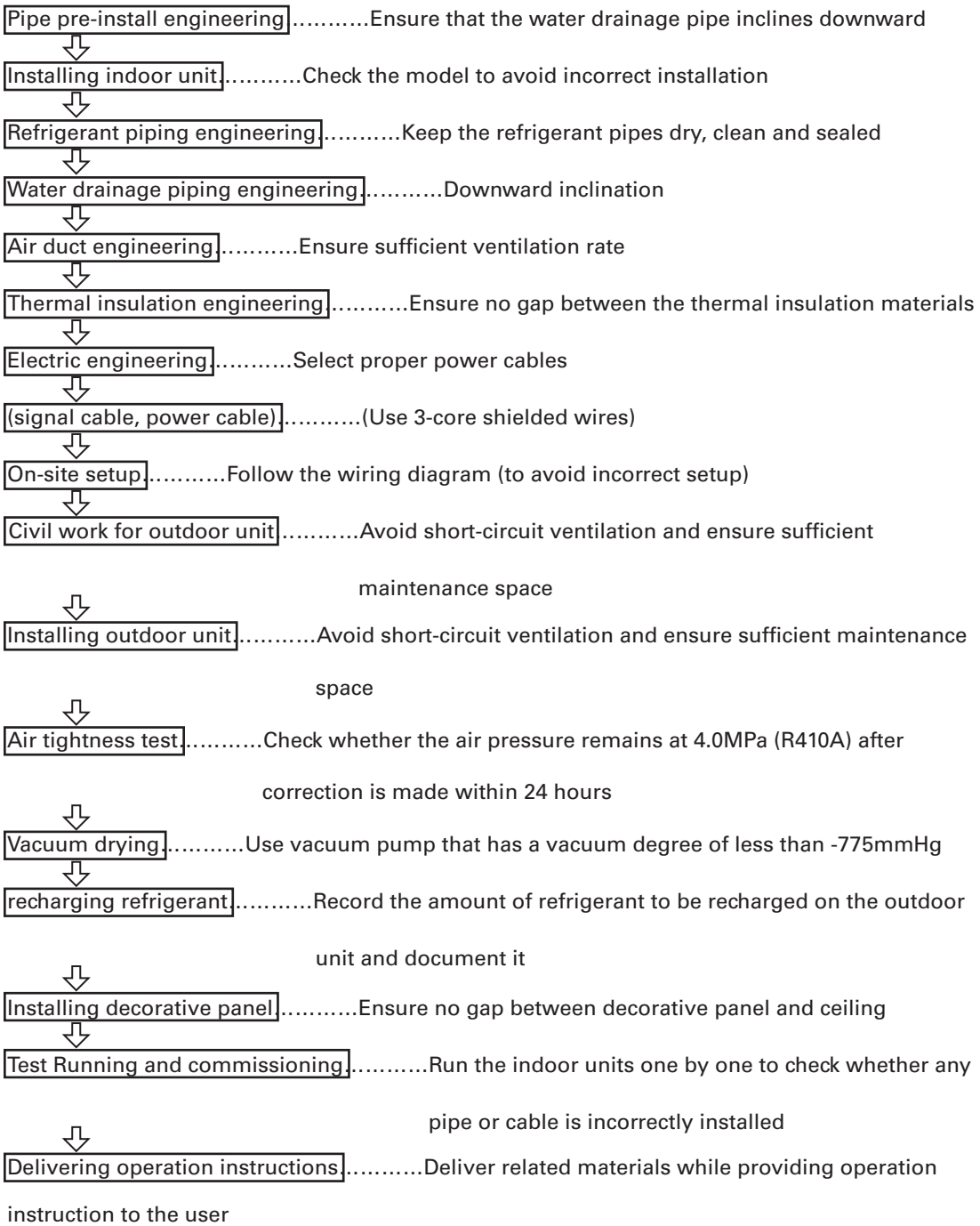
Effect of installation issues on equipment:

Figure 4


Leakage of refrigerant pipe
Insufficient refrigerant
Filth blockage of refrigerant pipe
Over heated running
Compressor fault
Moisture of refrigerant pipe
Product of the chemical reaction between ice or water of throttling parts and the refrigerant damages the insulation
Improper installation
Poor heat dissipation of outdoor unit
Degraded heat exchange effect of indoor unit
No maintenance space leading to difficult in upkeep
Degraded efficiency or abnormal protection
No insulation test for power supply line
Cross connection between power cable and signal
Damaged electric parts

General procedure

Figure 5


Pipe pre-install engineering.....Ensure that the water drainage pipe inclines downward
Installing indoor unit.....Check the model to avoid incorrect installation
Refrigerant piping engineering.....Keep the refrigerant pipes dry, clean and sealed
Water drainage piping engineering.....Downward inclination
Air duct engineering.....Ensure sufficient ventilation rate
Thermal insulation engineering.....Ensure no gap between the thermal insulation materials
Electric engineering.....Select proper power cables
(signal cable, power cable).....(Use 3-core shielded wires)
On-site setup.....Follow the wiring diagram (to avoid incorrect setup)
Civil work for outdoor unit.....Avoid short-circuit ventilation and ensure sufficient maintenance space
Installing outdoor unit.....Avoid short-circuit ventilation and ensure sufficient maintenance space
Air tightness test.....Check whether the air pressure remains at 4.0MPa (R410A) after correction is made within 24 hours
Vacuum drying.....Use vacuum pump that has a vacuum degree of less than -775mmHg
recharging refrigerant.....Record the amount of refrigerant to be recharged on the outdoor unit and document it
Installing decorative panel.....Ensure no gap between decorative panel and ceiling
Test Running and commissioning.....Run the indoor units one by one to check whether any pipe or cable is incorrectly installed
Delivering operation instructions.....Deliver related materials while providing operation instruction to the user

Note:

The general procedure for refrigerant machine is subject to change according to the situation.

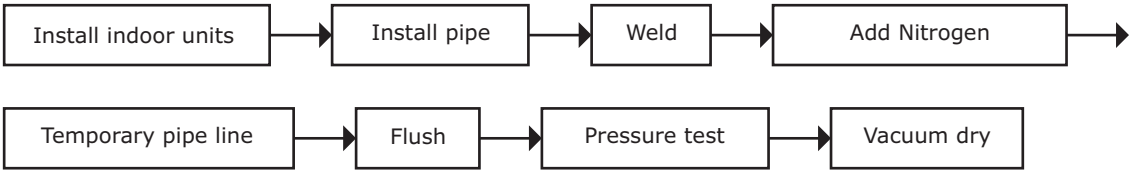
Procedure of indoor unit installation

Figure 6

Note:

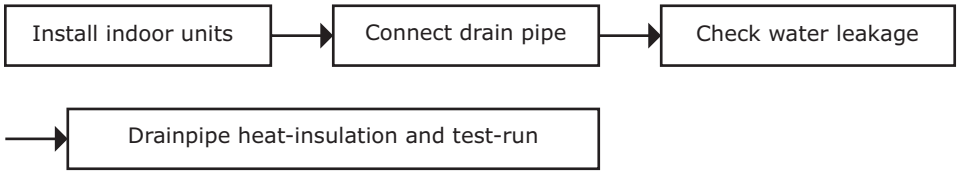
- *The hook must be strong enough to sustain the weight of indoor unit.*
- *Check the models of indoor units before installation.*
- *Pay attention to the main devices, such as the pipeline.*
- *Hold enough places for maintenance.*

Figure 7



Drainage pipe procedure

Figure 8



Note: *It is unnecessary to insulate the drainpipe if you choose the plastic pipe as drainpipe.*

Electric wiring

- Please select power supply for indoor unit and outdoor unit separately. Both indoor units and outdoor units should be grounded well.
- The power supply should have specified branch circuit with leakage protector and manual switch.
- Please put the connective wiring system between indoor unit and outdoom unit with refrigerant piping system together.
- Power wiring should be done by professional electrician and complied with relevant National Electric Standard.
- The power supply, leakage protector and manual switch of all the indoor units connected to the same outdoor unit should be universal. (Please set all the indoor unit power supply of one system into the same circuit.)
- It is suggested to use 3-core shielded wire as signal wire between indoor and outdoor units. Multi-core wire is unavailable and pay attention to the consistency. When signal wire parallel to the power wire, please keep enough distance (about 300mm at least) to prevent interference.
- The power wire and signal wire can’t be enlaced together.

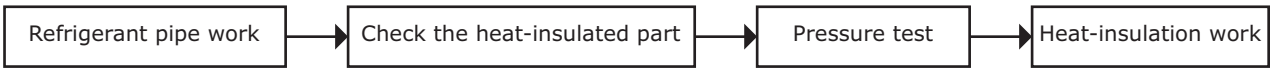
Lay the indoor pipeline

Note:

Collocate the air-outlet reasonably to· prevent airflow short-circuit. Check whether the static pressure is in the allowable range. The air filters should be easy to unpick and wash. Do pressure test on pipeline.

Heat-insulation procedure

Figure 9

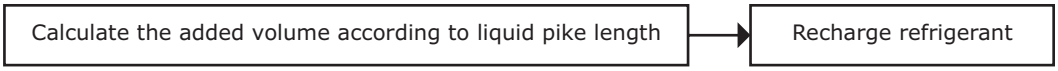


Note:

- *Gutter must be set around the foundation to drain the condensation water.*
- *When installing outdoor units at the roof, please check the strength of the roof and pay attention not to destroy the waterproof of the roof.*

Recharge refrigerant procedure

Figure 10



Note:

Please calculate the exact additional amount of refrigerant according to the supplied formula.

Main points of test running and commission

Please check the following issues before turning on the power:

- Vacuum dry: Make sure the vacuum degree accord with our requirement about 10-5.
- Wiring: Includes the power wiring and communication wiring; recheck the connection according to our corresponding wiring diagrams. Especially, please remember our communication wire is polar, which means you must connect the communication wire correspondingly to the terminal block.
- Additional charge of refrigerant: Recheck the calculation formula and recalculate the total recharge volume according to our supplied formula.
- Open the stop-valve of gas and liquid pipe with Allen key; check leakage of stop-valve with soap water. Please confirm whether the outdoor unit has been connected to the power for 12hr before start test running.

Test running: Turn on all of the indoor units and set the temperature at 17°C in cooling mode and high fan speed. After the operation of the system, check the parameters of the system, including indoor units and outdoor units.

Installation Preparation

Installation tools and instruments

All the necessary tools should be available, and their models and specifications should meet the installation and technical requirements. The instruments and meters should be tested or verified, and their scales and accuracy should meet the requirements. The common tools for installing refrigerant machine are listed below.

Table 15

No.	Name	Specification/Model	No.	Name	Specification/Model
1	Pipe cutter		15	Electronic scale	
2	Steel saw		16	Stop	
3	Pipe bender	Spring, mechanic	17	Thermometer	
4	Pipe expander	Depend on the pipe diameter specification	18	Meter rule	
5	Flaring tool	Depend on the pipe diameter specification	19	Screw driver	"-", "+"
6	Brazing welder	Depend on the nozzle size		Adjustable spanner	
7	Scraper		21	Resistance tester	
8	File/Rasp		22	Electro probe	
9	Injection tube		23	Multimeter	
10	Double-ended pressure gauge	4.0MPa	24	Pressure reducing valve	
11	Pressure gauge	1.5MPa, 4.0MPa	25	Wire pliers	
12	Vacuum gauge	-756mmHg	26	Clamping pliers	
13	Vacuum pump	At least 4 liters/second	27	Hexagon ring spanner	
14	Horizontal rule		28	Torque wrench	

In addition, tools such as electric welder, cutter, A-shape ladder, electric drill, folding machine, forming machine, nitrogen cylinder are also generally used during the installation.

Audit of construction drawings

Before the engineering installation, read the related drawing to understand the design intention carefully; audit the drawings and then work out a detailed engineering organization plan.

- Make sure that the pipe diameters and branch pipe models meet the technical specifications.
- Ratio of slope, drainage mode and thermal insulation of condensate water.
- Make air duct and air opening, and air ventilation organization.
- Configure specifications, model and control mode of power cables.
- Make total length and control mode of control cable.

The engineering construction staff should follow the construction drawing strictly during the construction.

If any change is required, such change should be approved by the design department and documented.

Construction organization plan

- Construction organization plan serves as the comprehensive technical and economic documents that guide the construction preparation and scientific construction organization. A reasonable construction organization plan and careful implementation are essential to ensure smooth construction, shorten construction period, ensure construction quality and improve economic results.
- The construction plan should be concise and focused on key procedures, construction method, and time coordination, space disposal of the construction around the features of the engineering, thus to ensure smooth construction operation.

Training of installation team

Establish sound training mechanisms. Service engineers are required to instruct installation team managers, work supervisors and managers to train workers of special type. Establish a management mechanism in which pre-working training, before-shift disclosure and after-shift implementation are available.

Coordination with other sectors

Ensure smooth coordination and meticulous organization between these sectors: air conditioning, civil work, electricity, water supply and drainage, fire protection, decoration, intelligence, etc. Try best to lay pipes of the air conditioning system along the bottom of the beam. If pipes meet together at the same height, follow these principles:

- Ensure that gravity pipes take precedence over water drainage pipes, air ducts and pressure pipes.
- Ensure that large pipes take precedence over air ducts and small pipes.

Pipe pre-install engineering

- Operation procedure

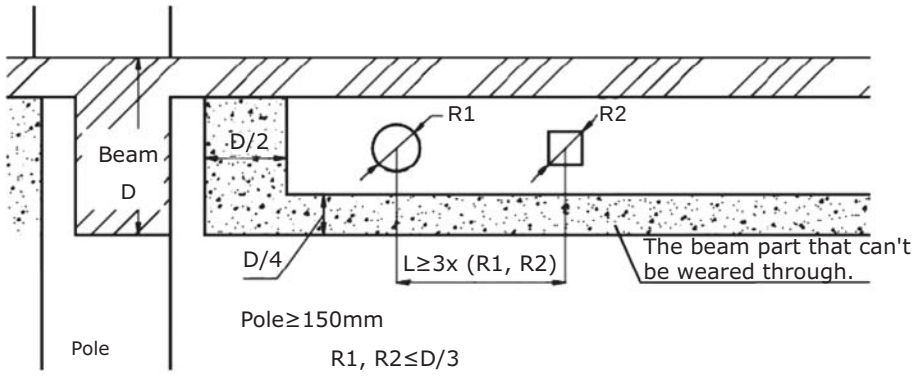
  Raise requirements to the civil work sector and coordinate→Determine the posiition, size and quantity of the machines, and conduct pre-installing→Check the pre-installing results.

- Pipeline route

  1. The pipe for condensate water should have a downward slope (the slope should be at least 1/100).
  2. The diameter of the through hole for the refrigerant pipe should take the thickness of the thermal insulation material into consideration (it is recommended to lay the gas pipe and liquid pipe in two separate columns).
  3. Note that sometimes through hole is not allowed because of the structure of the beam.

Figure 11

eg. Strengthen the transfixion hole



- Highlights:
  1. When selecting the parts to be pre-installed, ensure that the weight of the accessories is also calculated.
  2. In a situation where metal parts to be pre-installed is not allowed, use expansion bolts while ensuring sufficient load—bearing capacity.

⚠ CAUTION

The above figure is for reference only. It is not recommended to dig holes on either the beam or the shear wall. If such operation is unavoidable, please consult the property owner (or manager) and the civil work sector, and get written approval from the competent authority.

⚠ WARNING

- Be sure only trained and qualified service personnel could install, repair or service the equipment.

  Improper installation, repair, and maintenance may result in electric shocks, short circuit, leaks, fire or other damage to the equipment.

- Install according to this installation instructions strictly.

  If installation is defective, it will cause water leakage, electrical shock fire.
- When installing the unit in a small room, take measures against to keep refrigerant concentration from exceeding allowable safety limits in the case of refrigerant leakage.

  Contact the place of purchase for more information. Excessive refrigerant in a closed ambient would lead to oxygen deficiency.
- Use the attached accessories parts and specified parts for installation. Otherwise, it will cause the fall of the unit, water leakage and electrical shock fire.
- Install at a strong and firm location which is able to withstand the set's weight.

  If the strength is not enough or installation is not properly done, the set will drop and cause injury.
- The appliance must be installed 2.5m above floor.
- The appliance shall not be installed in the laundry.
- Before obtaining access to terminals, all supply circuits must be disconnected.
- The appliance must be positioned so that the plug is accessible.
- The enclosure of the appliance shall be marked by word or symbols with the direction of the fluid flow.
- For electrical work, follow the local national wiring standard, regulation and installation instruction.

  An independent circuit and single outlet must be used.

  If electrical circuit capacity is not enough or defect in electrical work, it will cause electrical shock fire.
- Use the specified cable and connect tightly and clamp the cable so that no external force will be acted on the terminal.

  If connection or fixing is not perfect, it will cause heat-up or fire at the connection.
- Wiring routing must be properly arranged so that control board cover is fixed properly.

  If control board cover is not fixed perfectly, it will cause heat-up at connection point of terminal, fire or electrical shock.
- If the supply cord is damaged, it must be replaced by the manufacture or its service agent or similarly qualified person in order to avoid a hazard.
- An all-pole disconnection switch having a contract separation of at least 3mm in poles should be connected in fixed wiring.
- When carrying out piping connection, take care not to let air substances go into refrigeration cycle.

  Otherwise, it will cause lower capacity, abnormal high pressure in the refrigeration cycle, explosion and injury.
- Do not modify the length of the power supply cord or use of extension cord nor share the single outlet with other electrical appliances.

  Otherwise, it will cause fire or electrical shock.
- Carry out the specified installation work after taking into account of winds, typhoons or earthquakes.

  Improper installation work may result in the equipment falling and cause accidents.

  Remark: Failure to observe a warning may result in death.

⚠ CAUTION

- Ground the air conditioner.

  Do not connect the ground wire to gas or water pipes, lightning rod or a telephone ground wire.

  Incomplete grounding may result in electric shocks.
- Be sure to install an earth leakage breaker.

  Failure to install an earth leakage breaker may result in electric shocks.
- Connect the outdoor unit wires, and then connect the indoor unit wires.

  You are not allowed to connect the air conditioner with the power source until wiring and piping the air conditioner is done.
- While following the instructions in this installation manual, install drain piping in order to ensure proper drainage and insulate piping so as to prevent condensation.

  Improper drain piping may result in water leakage and property damage.
- Install the indoor and outdoor units, power supply wiring and connecting wires at least 1 meter away from televisions or radios in order to prevent image interference or noise. Depending on the radio waves, a distance of 1 meter may not be sufficient enough to eliminate the noise.
- The appliance is not intended for use by young children or infirm persons without supervision. Young children should be supervised to ensure that they do not play with the appliance.
- Don't install the air conditioner in the following locations:

  There is petrolatum existing.

  There is salty air surrounding (near the coast).

  There is caustic gas (the sulfide, for example) existing in the air (near a hot spring).

  The Volt vibrates violently (in the factories).

  In buses or cabinets.

  In kitchen where it is full of oil gas.

  There is strong electromagnetic wave existing.

  There are inflammable materials or gas.

  There is acid or alkaline liquid evaporating.

  Other special conditions.
- The insulation of the metal parts of the building and the air conditioner should comply with the regulation of National Electric Standard.

  Remark: Failure to observe a caution may result in injury or damage to the equipment.

Units Installation

Installation of Indoor Unit

Installation procedure

Determine the installation position→Scribing and locating→Installing suspension road→ Installing the indoor unit

Cautions for installation and checking

- Drawing check: Confirm the specification, model and installation direction of the set.
- Height: Ensure that it perfectly fits the ceiling.
- Suspension strength: The suspension road shall be strong enough to bear the weight twice of the indoor unit to ensure that no abnormal vibration or noise is generated when the set is running.
- When installing the indoor unit, ensure that sufficient space is available for installing condensate water pipe.
- Horizontal degree: It shall be kept within ±1°.

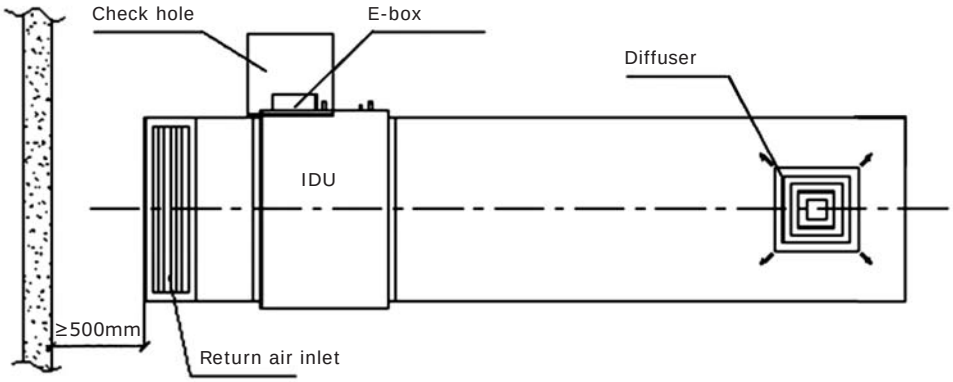
  Purpose: Ensure smooth drainage of condensate water. Also ensure stability of the machine body to induce the risks caused by vibration and noise.

  Hidden trouble of incorrect operation: a. Water leakage; b. Abnormal vibration and noise.
- Ensure sufficient maintenance&upkeep is available (keep a large enough maintenance hole, typically 400x400mm).
- Avoid short-circuit ventilation.

  Purpose: Ensure sufficient heat exchange of indoor unit and good air conditioning effect.

  Risk of incorrect operation: Poor air conditioning effect and abnormal protection of thle set.

Figure 12



Installation of Outdoor Unit

Acceptance and unpacking

- After the machine arrives, check whether it is damaged during the shipment. If the surface or inner side of the machine is damaged, submit a written report to the shipping company.
- Check whether the model, specification and quantity of the equipment conform to the contract.
- After removing the outer package, please keep the operation instructions well and count the accessories.

Hoisting outdoor unit

- Do not remove any package before the hoisting. Use two ropes to hoist the machine, keep the machine in balance, and then raise it safely and steadily. In case of no package or if the package is damaged, use plates or packing material to protect it.
- When conveying and hoisting the outdoor unit, keep it upright and ensure that the slope does not exceed 30°, always keep safety in mind.

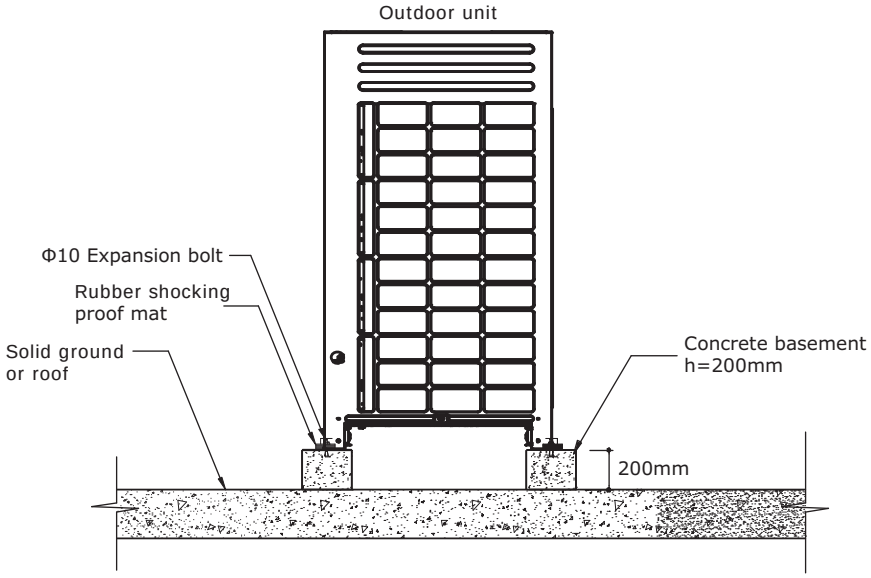
Selecting installation position

- Ensure that the outdoor unit is installed in a dry, well-ventilated place.
- Ensure that the noise and exhaust ventilation of the outdoor unit do not affect the neighbors of the property owner or the surrounding ventilation.
- Ensure that the outdoor unit is installed in a well-ventilated place that is closest to the indoor unit.
- Ensure that the outdoor unit is installed in a cool place without direct sunshine exposure or direct radiation of a high-temperature heat source.
- Do not install the outdoor unit in a dirty or severely polluted place, so as to avoid blockage of the heat exchanger in the outdoor unit.
- Do not install the outdoor unit in a place with oil pollution, salt or high content of harmful gases such as sulfurous gas.

Base for outdoor unit

- A solid, correct base can:
  1. Avoid the outdoor unit from sinking.
  2. Avoid the abnormal noise generated due to base.
- Base types
  1. Steel structure base.
  2. Concrete base (see the figure below for the general making method).

Figure 13



Remark:

The key points to make basement:

1. The master unit's basement must be made on the solid concrete ground. Refer to the structure diagram to make concrete basement in detail, or make after field measurements.
2. In order to ensure every point can contact evenly, the basement should be on completely level.
3. If the basement is placed on the roofing, the detritus layer isn't needed, but the concrete surface must be flat. The standard concrete mixture ratio is cement 1/sand 2/carpolite 4, and adds Φ10 strengthen reinforcing steel bar, the surface of the cement and sand plasm must be flat, border of the basement must be chamfer angle.
4. In order to drain off the seeper around the equipment, a discharge ditch must be setup around the basement.
5. Please check the affordability of the roofing to ensure the load capacity.

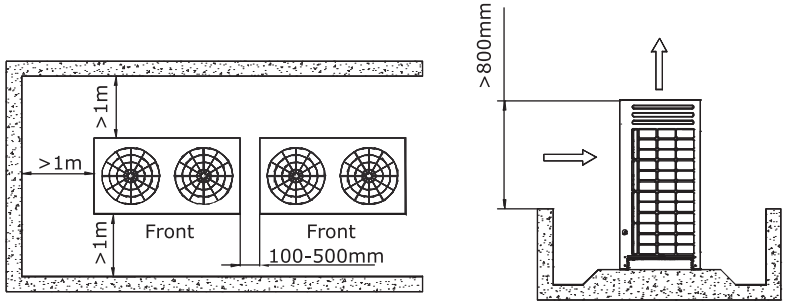
Installation highlights for outdoor unit

- Install vibration isolator or isolating pad between the set and the base by the design specification.
- Ensure close between the outdoor unit and the base, otherwise significant vibration and noise may occur.
- Ensure that outdoor unit is well grounded.
- Before commissioning, do not turn on the valves of the gas pipe and liquid pipe of the outdoor unit.
- Ensure sufficient maintenance space is available at the installation site.

Installation space for outdoor unit

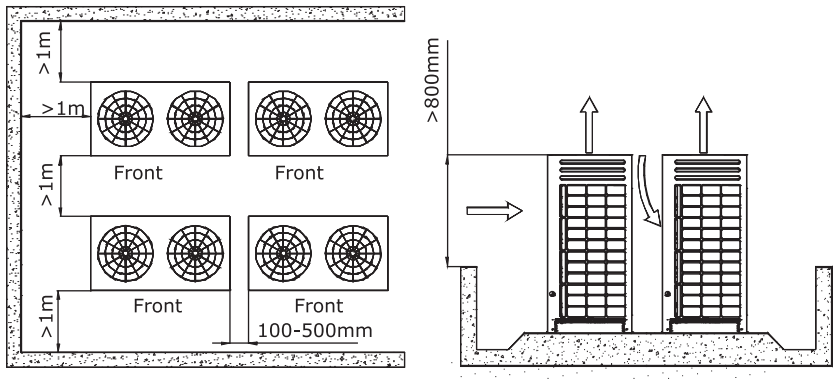
- **One row:**

Figure 14



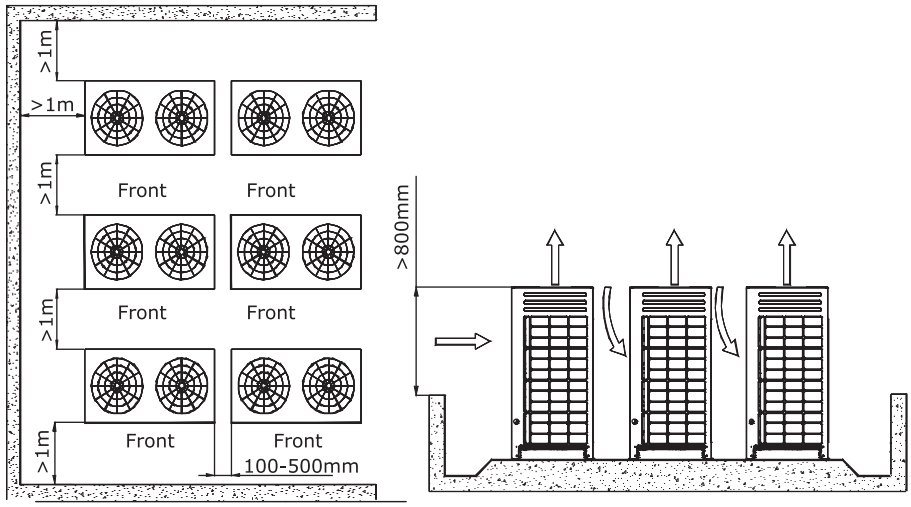
- **Two rows**

Figure 15



- **More than two rows**

Figure 16

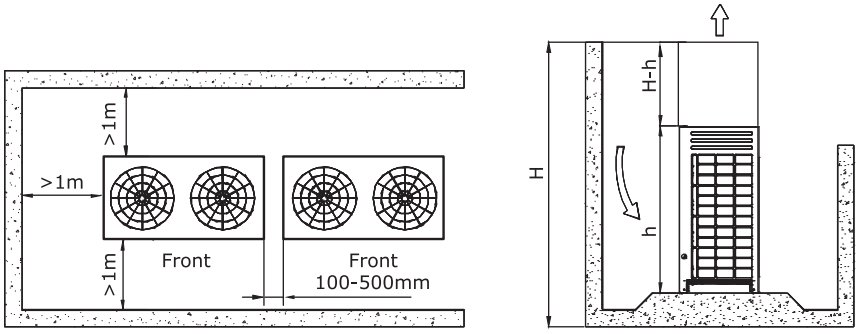


- **When the outdoor unit is lower than the surrounding obstacle**

  Refer to the layout used when the outdoor unit is higher than the surrounding obstacle. However, to avoid cross connection of the outdoor hot air from affecting the heat exchange effect, please add an air director onto the exhaust hood of the outdoor unit to facilitate heat dissipation.

  See the figure below. The height of the air director is HD (namely H-h). Please make the air director on site.

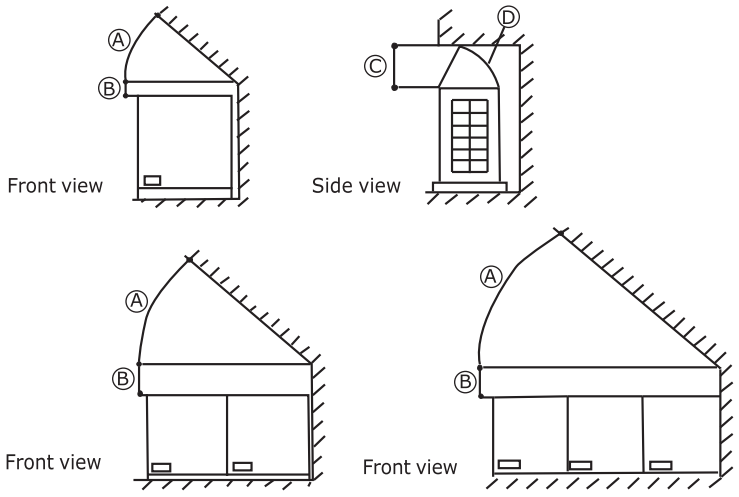
Figure 17



- **For limited space installation**

  If miscellaneous articles are piled around the outdoor unit, such articles must be 800mm below the top of the outdoor unit. Otherwise, a mechanic exhaust device must be added.

Figure 18

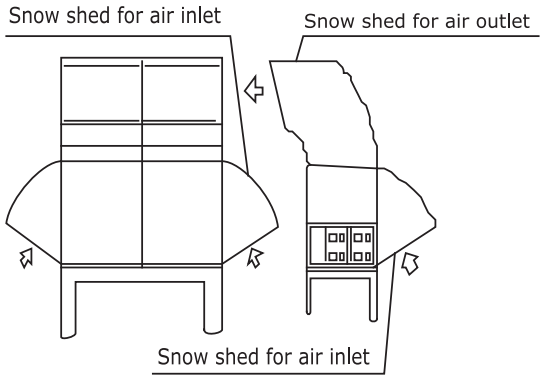


Ⓐ >45°
Ⓑ >300mm
Ⓒ >1,000mm
Ⓓ Airflow deflector

- **Set the snow-proof facility**

  In snowy areas, facilities should be installed to prevent snow. (See the figure below) (defective facilities may cause malfunction.) Please lift the bracket higher and install snow shed at the air inlet and air outlet.

Figure 19



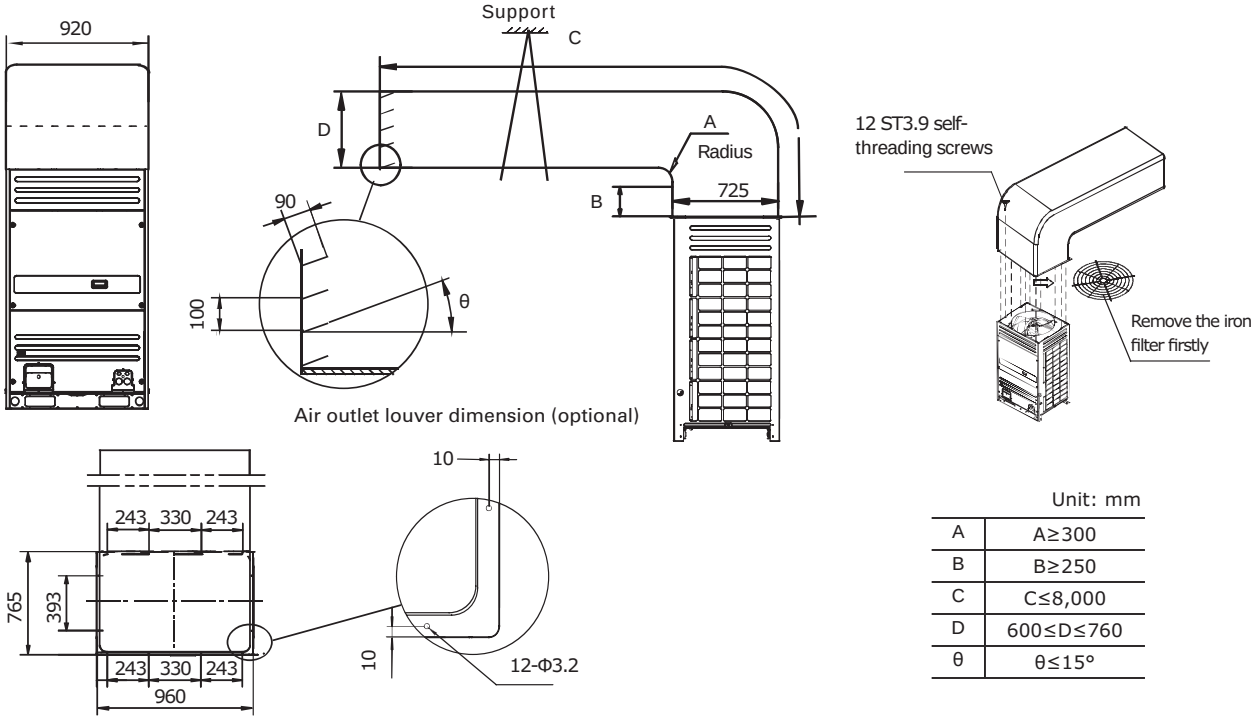
Mount the air deflector

When installing, takes off the mesh firstly, and then conduct in according of the following two schedules.

- Installation of 4TVH0086-0096

Figure 20

Schedule 1:

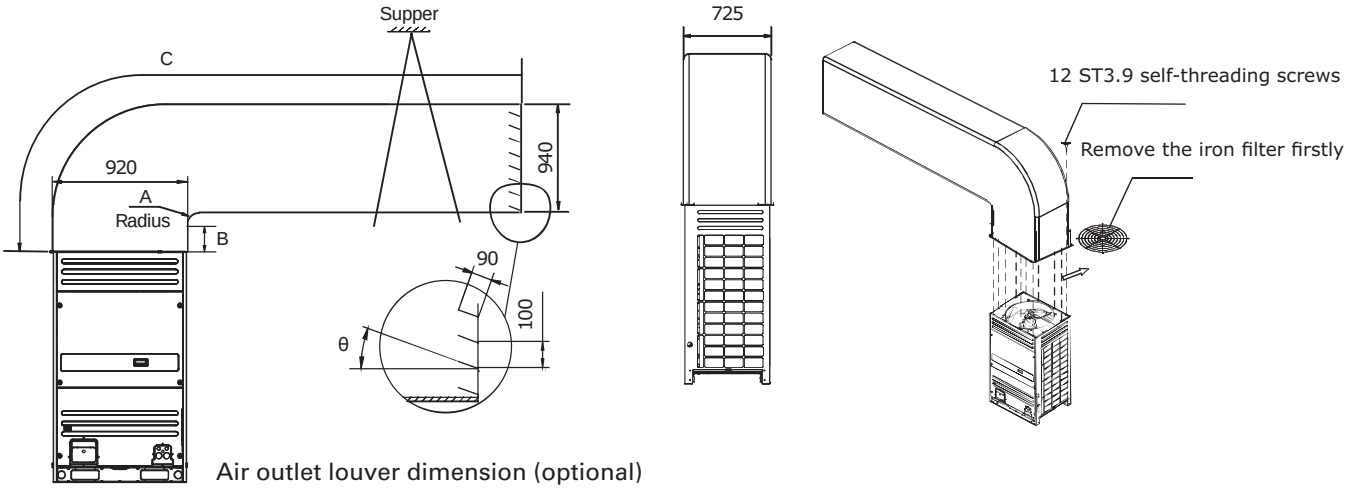


Unit: mm

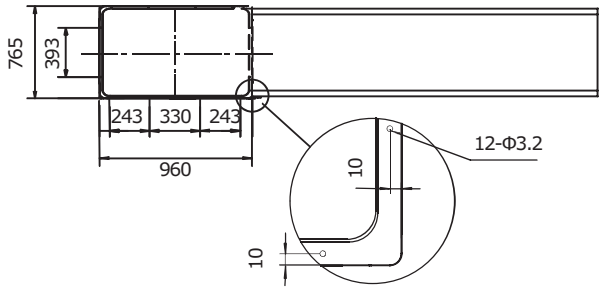
A	A≥300
B	B≥250
C	C≤8,000
D	600≤D≤760
θ	θ≤15°

Figure 21

Schedule 2:



Air outlet louver dimension (optional)



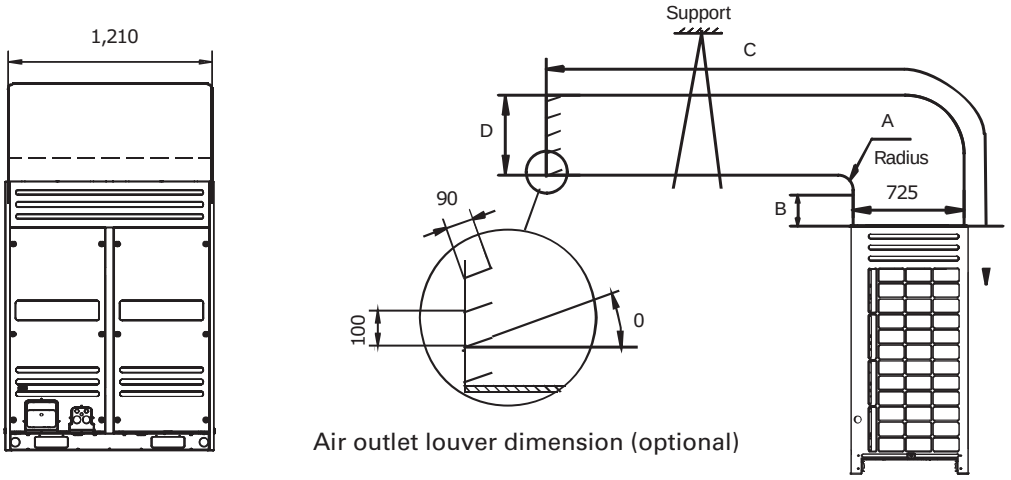
Unit: mm

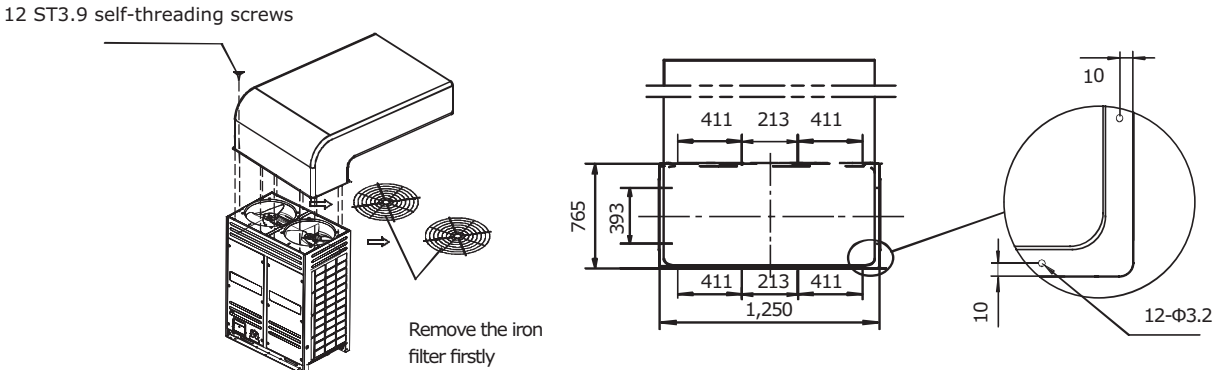
A	A≥300
B	B≥250
C	C≤8,000
θ	θ≤15°

- Installation of 4TVH0115-0155

Figure 22

Schedule 1:



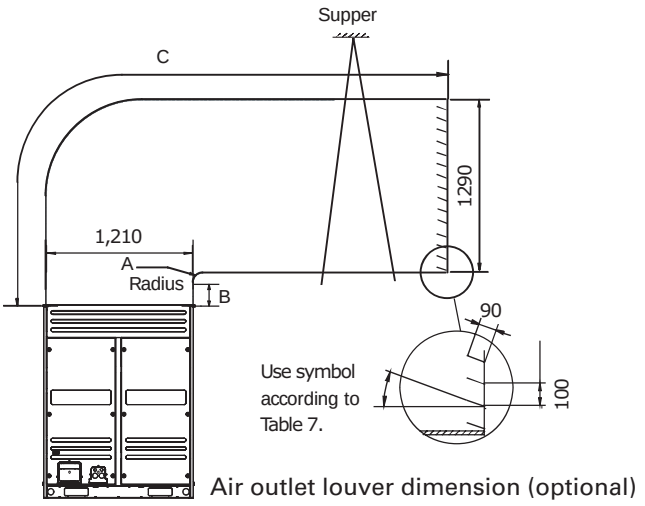


Unit: mm

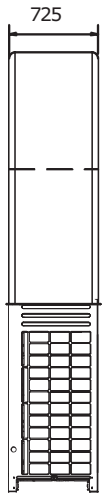
A	A≥300
B	B≥250
C	C≤8,000
D	600≤D≤760
θ	θ≤15°

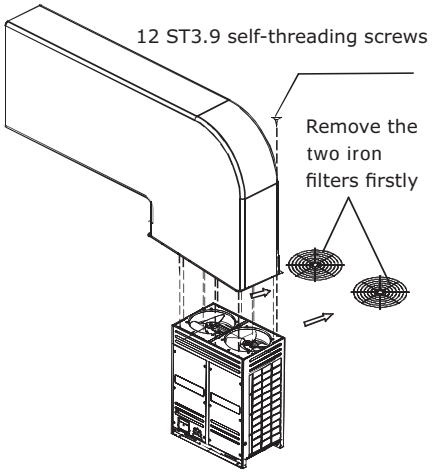
Figure 23

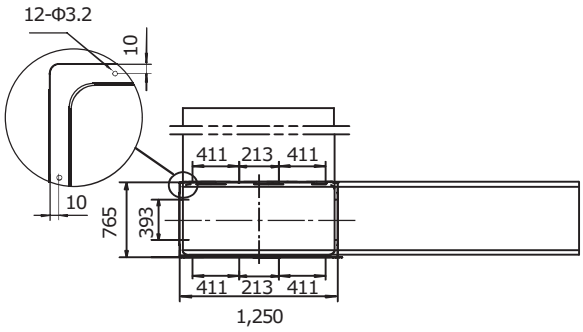
Schedule 2:



Air outlet louver dimension (optional)







Unit: mm

A	A≥300
B	B≥250
C	C≤8,000
θ	θ≤15°

Note:

- *Before install the air deflector, please ensure the mesh enclosure has been took off; otherwise the air supply efficiency would be block down.*
- *Once mounting the shutter to the unit, air volume, cooling (heating) capacity and efficiency would be block down, this affection enhance along with the angle of the shutter. Thus, it is not recommended to mount the shutter. If it is unavoidable, please adjust the angle of shutter no larger than 15°.*
- *Only one bending site is allowanced in the air duct, otherwise, device may malfunction.*

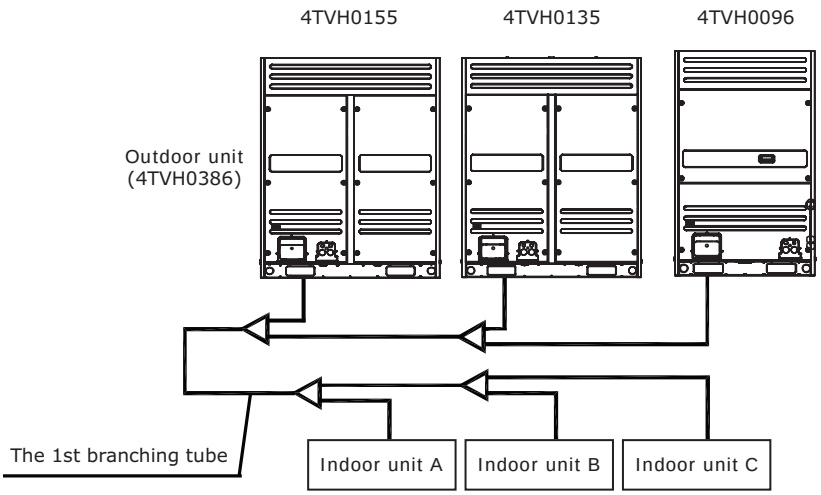
Arrangement of outdoor units

If more than two outdoor units are combined in the system, these outdoor units shall be arranged according to the descending order of their coating capacity, and the outdoor unit with the highest cooling capacity shall be placed at the first branch pipe. In addition, the outdoor unit with the highest cooling capacity shall be set to master unit, while others shall be set to slave units.

Take a system with outdoor units of 4TVH0386 (4TVH0115+4TVH0135+4TVH0155) as an example:

- Place the outdoor unit of 4TVH0155 beside the first branch pipe (see the figure below).
- Place the outdoor units in the descending order of their cooling capacity, namely, 4TVH0155, 4TVH0135and 4TVH0096.
- Set the outdoor unit of 4TVH0155 to master unit, and the outdoor units of 4TVH0135 and 4TVH0096 to slave unit.

Figure 24



Remark:

All the outdoor units should be installed on the location of same level, otherwise it may cause imbalance of refrigerant distributing and lead to the fault of the compressors.

Although the TVR™ II outdoor units can auto balance the load due to the master free cycle duty operation, it is still recommended to install the biggest unit close to the first branch and set as master.

Refrigerant Pipe Engineering

Refrigerant Pipe Processing

Basic requirements

- **Operation procedure**

  Determine the route and size of the pipeline according to the construction drawing→Make and install bracket, hanger and support→Make and arrange pipe accessories→Recharge nitrogen gas for protection→Brazing welding→Pipe flushing→Air tightness test→Thermal insulation→Vacuum drying.

- **Three principles for refrigerant piping**

Table 16

Item	Reasons	Countermeasure
Dry	The existence of rain, engineering water, condensate water produced in the pipe	The process of tubing must be criterion → Blow cleanly → Vacuum
Cleanness	Existence of oxide produced by welding, outside dust or sundries	Charge nitrogen gas when welding Pay attention to cleanness during the piping process → Blow cleanly
Air tightness	Imprecise weld, unqualified air-proof to bell-mouth, leakage of the fringe	Use the suited welding rod to weld Comply to the welding operation criteria Comply to hell-mouth connecting operation criteria Comply to the interface operation criteria → Air tightness test

⚠ CAUTION

Remove oil for copper pipe of a system that uses R410A.

For the system that uses R410A, oil-free copper pipes should be selected (they can also be customized).

If ordinary (oily) copper pipes are used, it must be cleaned with gauze that is dipped into tetrachloroethylene solution.

Purpose of cleansing copper pipe: Remove the tube (industrial oil used during the processing of the copper pipe) attached to the inner wall of the copper pipe. The ingredients of such tube are different from those of the tube used by the R410A refrigerant, and they will produce deposit through reaction, which may cause complicated system fault.

Special Note:

Never use CC14 for pipe cleansing and flushing, or the system will be seriously damaged.

- **Support for refrigerant pipe**

1. Fix horizontal pipe

   When the air conditioner is running, the refrigerant pipe will deform (for example, shrunk/expanded or inclined downward). To avoid pipe damage, use hanger or support to support it (see the table below for the criteria).

Table 17

Pipe Diameter (mm)	Less than Φ20	Φ20-40	Less than Φ40
Interval between support points (m)	1	1.5	2

In general, gas pipe and liquid pipe should be suspended in parallel, and the interval between support points should be selected according to the diameter of the air pipe.

Since the temperature of the flowing refrigerant will change as the operation and working condition change, which will result in hot expansion and cold shrinkage of the refrigerant pipe, so the pipe with thermal insulation should not be clamped tightly, otherwise the copper pipe may get broken due to stress concentration.

2. Fix vertical pipe

   Fix the pipe along the wall according to the pipeline route. Round log should be used at the pipe clip to replace thermal insulation material, “U”-shape pipe should be fixed outside the round log, and the round log should be provided with anticorrosion treatment.

Table 18

Pipe Diameter (mm)	Less than Φ20	Φ20-40	Less than Φ40
Interval between support points (m)	1.5	2.0	2.5

3. Local fixing

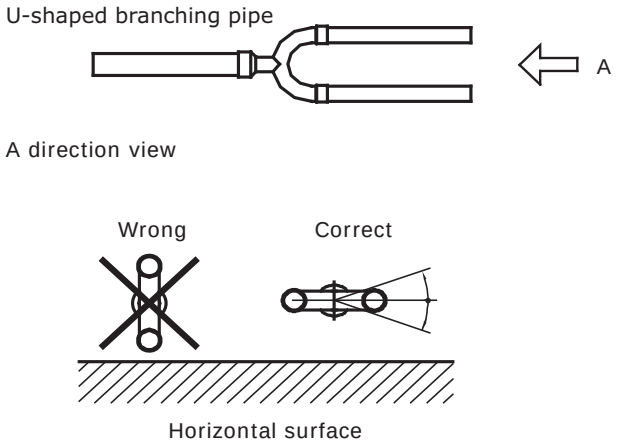
   To avoid stress concentration due to expansion and shrinkage of the pipe, it is usually required to conduct local fixing beside the wall through-holes of the branch pipe and end pipe.

- **Requirements for installing branch pipe subassembly**

  When laying the branch pipe subassembly, pay attention to the following issues:

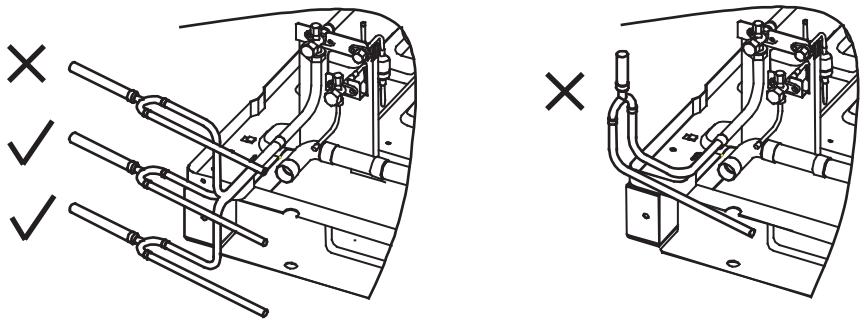
1. Do not replace branch pipe with tee pipe.
2. Follow the construction drawing and installation instructions to confirm the models of branch pipe subassembly as well as the diameters of main pipe and branch pipe.
3. Neither sharp bend (an angle of 90°) nor connection to other branch pipe subassembly is allowed at places within 500mm away from the branch pipe subassembly.
4. Try best to install the branch pipe subassembly at a place that facilitates welding (if doing so is impossible, it is recommended to prefabricate the subassembly).
5. Install vertical or horizontal branch joint, and ensure that the horizontal angle is within 10°. Refer to the below picture:

Figure 25



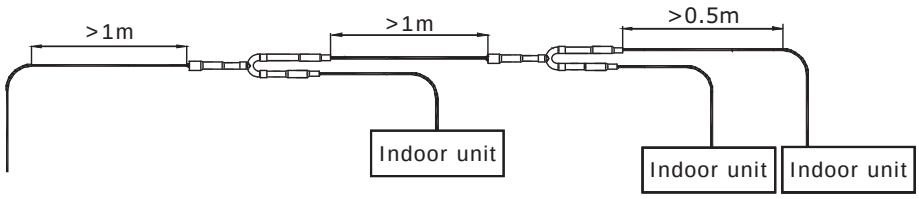
6. To avoid oil accumulate at the outdoor unit, please install the branching pipes properly.

Figure 26



7. To ensure even diversion of refrigerant, pay attention to the distance between the branch pipe subassembly and the horizontal straight pipe.
   a. Ensure that the distance between the bending point of copper pipe and the horizontal straight pipe section of the adjacent branch pipe is no less than 1m.
   b. Ensure that the distance between the horizontal straight pipe sections of the two adjacent branch pipes is no less than 1m.
   c. Ensure that the distance between the branch pipe and the horizontal straight pipe section used to connect the indoor unit is no less than 0.5m.

Figure 27



Storage and maintain of copper pipe

- **Pipe carriage and storage**

  1. Avoid the pipe from bending or deforming during the carriage.
  2. Seal the openings of the copper pipe with end cover or adhesive tape during the storage.
  3. Place the coil upright to avoid compressing deformation due to self weight.
  4. Use wooden support to ensure that the copper pipe is higher than the ground, so as to make the pipe dust-proof and water-proof.
  5. Take dust-proof and water-proof measures at both ends of the pipe.
  6. Keep the pipes on special bracket or bench at specified place on the constructtion site.

- **Correct to seal the opening**

  1. There are two ways for opening sealing:

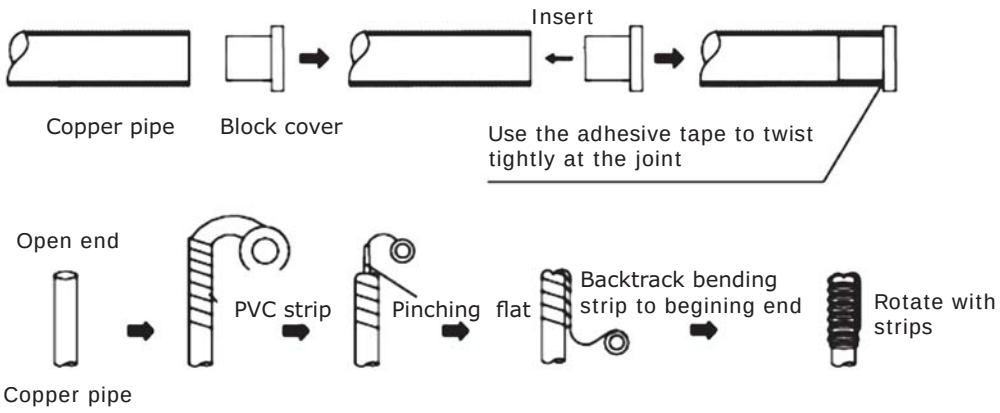
     a. Sealing with cover or adhesive tape (suitable for short-term storage)
     b. Sealing welding (suitable for long-term storage)

⚠ CAUTION

The openings of the copper pipe must be sealed at any time during the construction.

- Method of sealing with cover or adhesive tape

Figure 28



It is recommended to seal the openings of the pipe with both cover and adhesive tape.

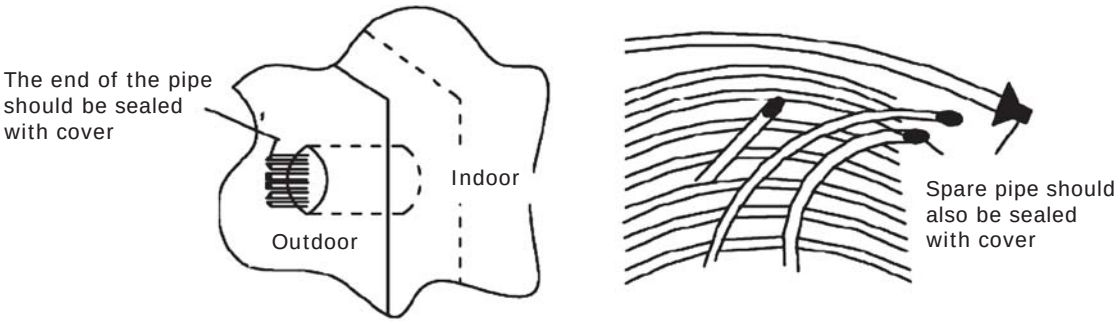
- Method of sealing welding

Figure 29

2. Special attention:

   a. When putting the copper pipe through the hole in the wall (dirt is easy to enter into the pipe)

Figure 30

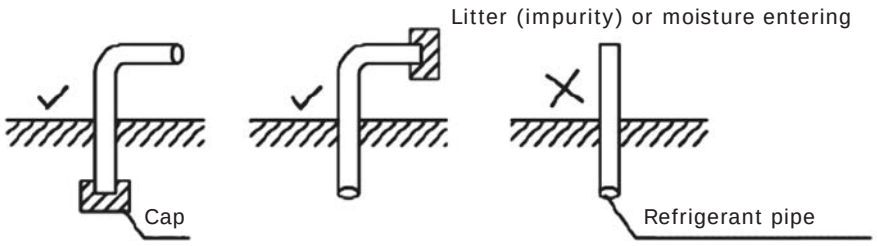


b. When the copper pipe goes outside the wall, ensure that no rain water can enter the pipe, particularly when the pipe is placed upright.

c. Before completing the pipe connection, seal the openings of the pipe with covers.

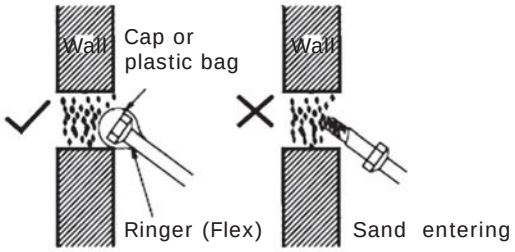
d. Place the openings of the pipe vertically or horizontally.

Figure 31



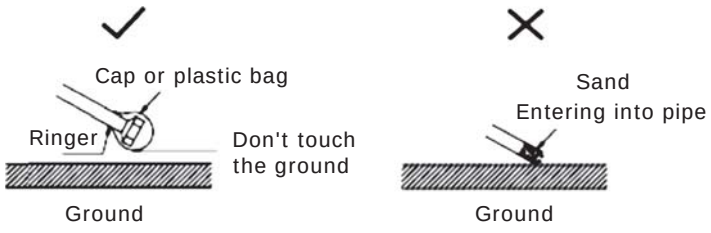
e. Before putting the pipe outside the wall, seal the opening of the pipe with a cover.

Figure 32



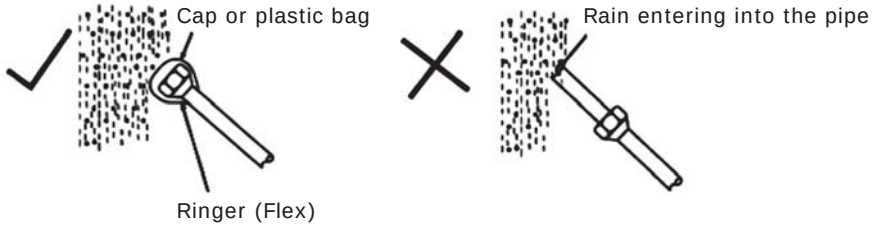
f. Do not place the pipe on the ground directly, nor keep it away from ground friction.

Figure 33



g. When conduct piping on a raining day, remember to seal the openings of the pipe first.

Figure 34



Processing of copper pipe

- **Pipe cutting**

  1. Tool

     Use a pipe cutter instead of a saw or cutting machine to cut the pipe.

  2. Correct operation procedure:

     Rotate the pipe evenly and forcibly in a low speed.

     Cut off the pipe while ensure that it does not deform.

  3. Caution if a saw or cutting machine is used to cut pipe:

     Copper chip will enter the pipe (in this case, it will be very difficult to clean up), or which may even enter the compressor or blocking the throttling unit.

- **Rectify opening of copper pipe**

  1. Purpose

     Clear out the burr at the opening of the copper pipe, clean the inside of the pipe, and rectify the opening of the pipe, so as to avoid scratch at the opening to be sealed during flaring.

  2. Operation procedure

     a. Use a scraper to remove the inner spurs. When doing so, keep the opening of the pipe downwards to avoid copper chip from entering the pipe.

     b. After the chamfering is completed, use veiling to remove the copper chip out of the pipe.

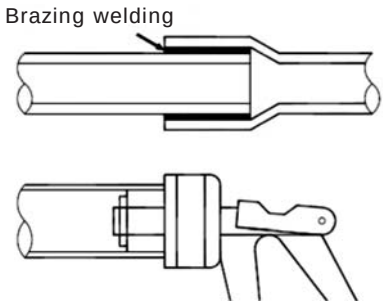
     c. Ensure no scar produced, so as to avoid the pipe from getting broken during flaring.

     d. If the pipe end obviously deforms, cut the end off and then cut the pipe again.

- **Pipe expansion**

  1. Purpose: Expand the opening of the pipe so that another copper pipe can be inserted to replace direct connection and reduce welding spots.
  2. Highlight: Ensure that the connection part is smooth and even; after cutting the pipe off, remove the inner spurs.
  3. Operation method: Insert the expanding header of the pipe expander into the pipe to expand the pipe. After completing pipe expansion, rotate the copper pipe in a small angle to rectify the straight line scratch left by the expanding header.

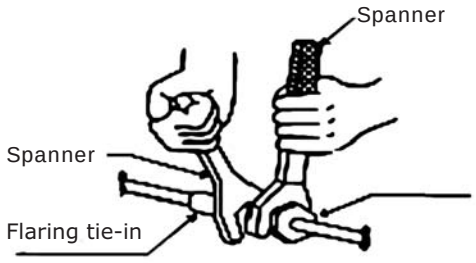
Figure 35



- **Opening bell-mouthed opening**

  1. Purpose: Flaring bell-mouthed opening is used for screw thread connection.
  2. Highlight:
     a. Before performing the bell-mouthed opening operation, perform fire annealing for the hard pipe.
     b. Use pipe cutter to cut pipe to ensure even cross section and avoid refrigerant leakage; do not use a steel saw or metal cutting device to cut pipe, otherwise the cross section will get deformed and the copper chip will enter the pipe.
     c. Remove burr carefully to avoid scar on the bell-mouthed opening, which may lead to refrigerant leakage.
     d. When connecting pipes, use two spanners (one torque wrench and one non-adjustable spanner).
     e. Before conducting opening bell-mouthed, install pipe onto the flaring nut.
     f. Use proper torque to tighten the flaring nut.

Table 19

Pipe Diameter	Torque		Legend
	(kgf-cm)	(N-cm)	
1/4" (6.35)	144~176	1,420~1,720	
3/8" (9.52)	333~407	3,270~3,990	
1/2" (12.7)	504~616	4,950~-6,030	
5/8" (15.88)	630~770	6,180~7,540	
3/4" (19.05)	990~1,210	9,270~11,860	

⚠ CAUTION

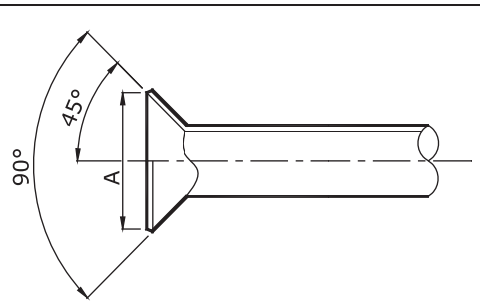
When you are tightening the flaring nut with a spanner, the tightening torque will be suddenly increased at a certain point. From this point, further tighten the flaring nut to the angles shown below.

Table 20

Pipe Diameter	Angle of further tightening	Recommended length of tool lever
3/8" (9.52)	60~90	About 200mm
1/2" (12.7)	30~60	About 250mm
5/8" (15.88)	30~60	About 300mm

g. Check whether the surface of the flaring opening is damaged. The size of the flaring opening is as shown below.

Table 21

Pipe Diameter	R410A	Legend
	Size of Flaring Opening (A)	
1/4" (6.35)	8.7~9.1	
3/8" (9.52)	12.8~13.2	
1/2" (12.7)	16.2~16.6	
5/8" (15.88)	19.3~19.7	
3/4" (19.05)	23.6~24.0	

⚠ CAUTIONS

- Apply some refrigeration oil onto the inner surface and outer surface of the flaring opening, to facilitate the connection or rotation of the flaring nut. Ensure close sticking between the sealing suirface and the bearing surface, and avoid pipe bending.
- Ensure that the flaring opening is not cracked or deformed, otherwise it cannot be sealed or cause refrigerant leakage after the system runs for some time.

- **Pipe bending**

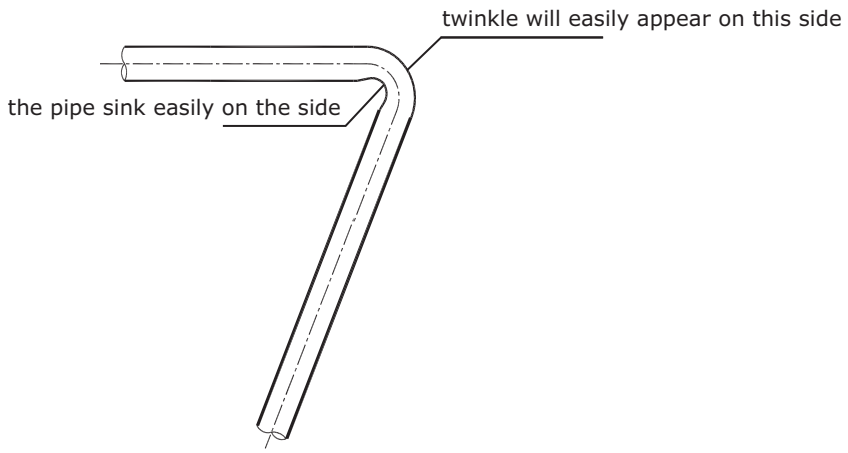
  1. Method
     a. Manual bending: Suitable for thin copper pipes (Φ6.35-Φ12.7).
     b. Mechanical bending: Suitable in a wide range of copper pipes (Φ6.35-Φ67). Spring bender, manual bender or electric bender is used.

     Purpose: Reduce welding joints and required elbows, and improve engineering quality. No joint is needed so as to save material.

⚠ CAUTION

- When bending a copper pipe, ensure that there is no twinkle or deformation on the inner side of the pipe.
- When using a spring bender, ensure that the bender is clean before inserting it in the copper pipe.
- When using a spring bender, ensure that the bending angle does not exceed 90°, otherwise twinkle will appear on the inner side of the pipe, and the pipe may easily get broken.
- Ensure that the pipe does not sink during the bending process; ensure that the cross section of the bending pipe is larger than 2/3 of the original area, otherwise it cannot be used.

Figure 36



Brazing welding operation

- **Selecting refrigerant pipe**

  1. All pipe use shall comply with national or local standards (for example, pipe diameter, material, thickness, etc.)
  2. Specification: Seamless phosphorus to oxygenate copper pipe
  3. Try best to use straight pipe or coil and avoid too much brazing welding.

Note: *Select the pipes according to the pipe diameters shown below (O-coil, 1/2H-straight pipe).*

Table 22

Outer Diameter	Material	Minimum Thickness	Outer Diameter	Material	Minimum Thickness	Outer Diameter	Material	Minimum Thickness
Φ6.35	O	0.8	Φ19.0	O	1.0	Φ38.0	1/2H	1.5
Φ9.52	O	0.8	Φ22.0	1/2H	1.2	Φ45.0	1/2H	1.5
Φ12.7	O	0.8	Φ25.0	1/2H	1.2	Φ54.0	1/2H	1.8
Φ15.9	O	1.0	Φ28.6	1/2H	1.3	Φ67.0	1/2H	1.8

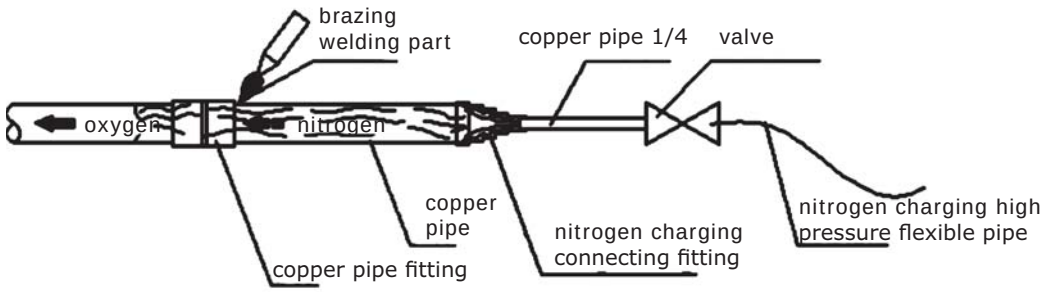
- **Nitrogen filled for protecting copper pipe during brazing welding**

  1. Purpose: Avoid oxide scale from appearing on the inner wall of the copper pipe in the high temp.
  2. Risks of Non-protective Welding:

     If no sufficient nitrogen is charged into the refrigerant pipe being welded, oxides will be generated on the inner wall of the copper pipe. These oxides will block the refrigerant system, which will lead to all kinds of malfunctions such as burn-out of the compressor, poor cooling efficiency.

     To avoid these problems, charge nitrogen continuously into the refrigerant pipe during the brazing welding, and ensure that the nitrogen passes through the operating point until the welding is completed and the copper pipe cools down completely. The schematic diagram for nitrogen charging is shown below.

Figure 37

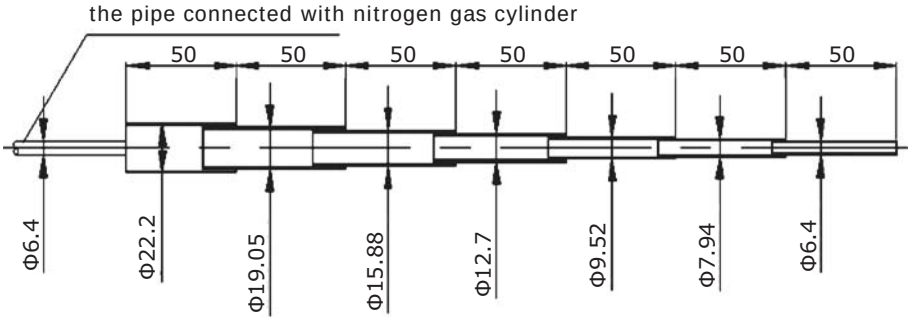


3. Making Nitrogen-Charging Pipe Joint

When welding the pipe joint, connect the nitrogen-charging joint to the pipe fittings to be welded.

The nitrogen-charging joint is shown below:

Figure 38

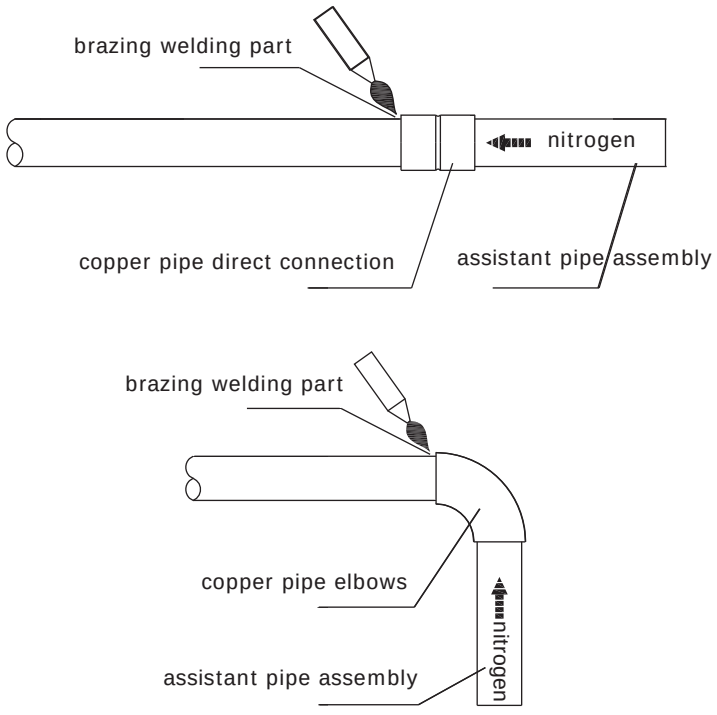


4. Cautions for Welding Pipe Fittings

a. Adopt transition pipe.

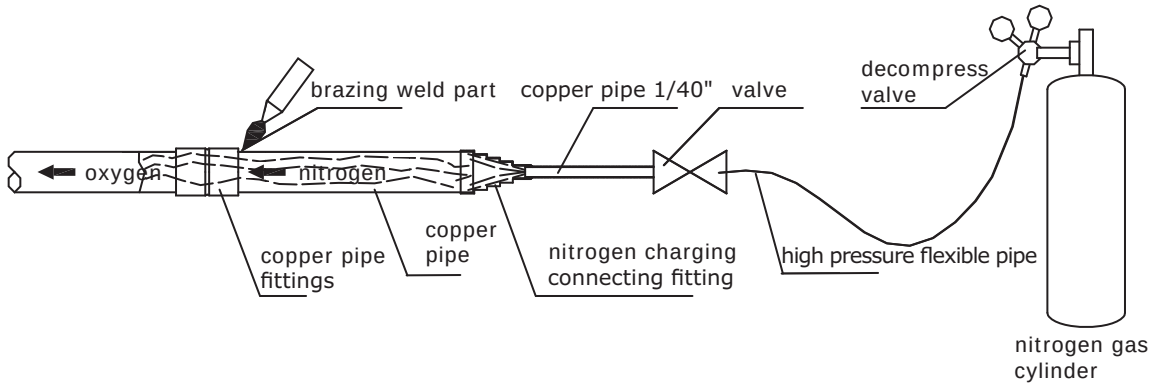
b. Charge nitrogen from the side of the short pipe, because short distance may result in perfectible nitrogen replacement effect.

Figure 39



5. Standard Operation of Brazing Welding

Figure 40



6. Highlight

a. Control the nitrogen pressure to be about 0.2-0.3kgf/cm^2 during the welding.

b. Ensure the gas is nitrogen; oxygen will easily leads to explosion, so it is forbidden.

c. Use pressure reducing valve, and control the pressure of the charged nitrogen to be about 0.2kg/cm^2

d. Select a proper position for charging nitrogen.

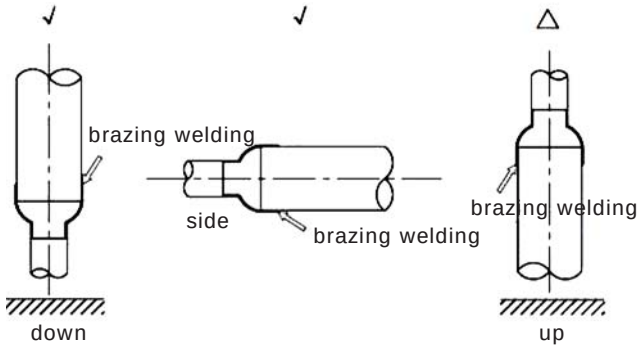
e. Ensure that the nitrogen passes through the welding spots.

f. If the pipeline between the position for charging nitrogen and the welding spot is rather long, ensure that the nitrogen is charged for sufficient time so as to discharge all the air from the welding spot.

g. After completing the welding, charge the nitrogen continuously until the pipe cools down completely.

h. Try best to conduct welding downwards or horizontally and avoid face-down welding.

Figure 41

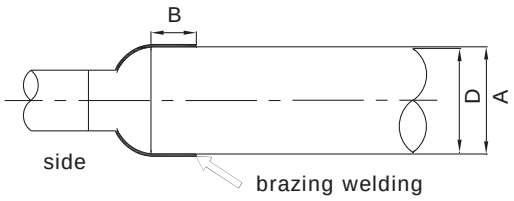


7. Cautions
   a. Take fire-prevention measures when conducting welding (ensure that a fire extinguisher is available beside the operating position).
   b. Avoid injury.
   c. Pay attention to the fit gap of the position where the pipe is inserted.

Note:

The follow table shows the relation between the minimum embedded depth and gap at the copper pipe joint.

Table 23

Type	Outer Diameter of Pipe (D) (mm)+	Minimum Inlaid Depth (B) (mm)	Gap A~D (mm)
	5<D<8	6	0.05~0.21
	8<D<12	7	
	11<D<16	8	0.05~0.27
	16<D<25	10	
	25<D<35	12	0.05~0.35
	35<D<45	14	

Pipe cleaning out

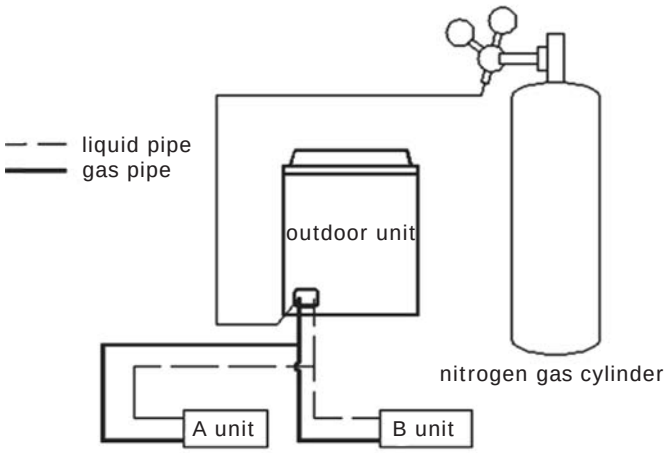
- **Flushing copper pipe**

1. Function: use pressure gas to flush pipeline (raw material or welded assembly) for eliminating dust, trash and moisture. Solid impurity is hard to be washed out, so special attention shall be drawn to the protection of copper pipeline during construction.
2. Purpose
   a. Eliminate oxide powder or part oxide layer in copper pipe.
   b. Help to clear out dirt and humidity in pipe.
3. Risk in case of no flushing:
   If the remaining solid impurity and moisture in pipeline could not be eliminated efifectively, serious malfunctions shall happen, such as ice blockage, dirt blockage and compressor being jammed.

- **Procedure of flushing**

1. Mounting pressure adjusting valve on nitrogen gas cylinder. The applied gas must be nitrogen. If adopting polytetrafluoro ethylene or carbon dioxide, there is a risk of condensation. If using oxygen, there is a risk of explosion.
2. Making use of inflation tube to connect outlet of pressure adjusting valve and inlet at liquid pipe side of outdoor unit.

Figure 42



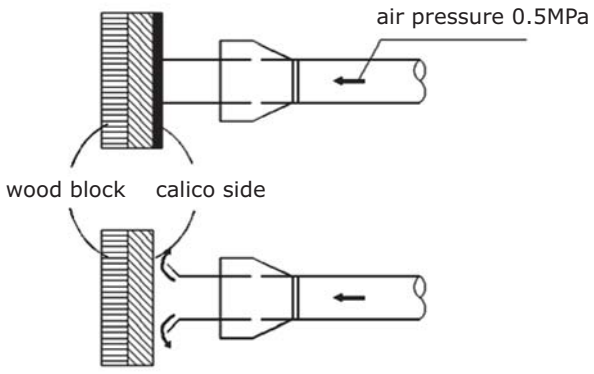
3. Use blind plug to block all connectors of liquid side copper line (including unit B) soundly, excluding indoor unit A.
4. Turn on nitrogen gas cylinder valve, and then pressurize to 5kgf/cm^2 gradually through adjusting valve.
5. Check whether nitrogen has passed through the liquid pipe at the side of indoor unit A. Connector at the side of indoor unit body has been covered by tape to prevent the entering of dirt.

- **Detailed steps for flushing**

1. Hold proper blockage material (such as block bag and white cotton) to push against the main pipe opening at the gas side of indoor unit.
2. When pressure increases and hands could not push against the opening, suddenly release pipe opening (flushing for first time).

   Repeat above step1 and step 2 to re-flush dirt (flushing for multi-times)

Figure 43



3. During flushing, place a piece of white cotton at the pipe opening for checking and you shall find some humidity occasionally.

   Way of thoroughly drying pipeline is as follows:

   a. Make use of nitrogen gas to flush the inner part of pipe until no dirt and humidity.

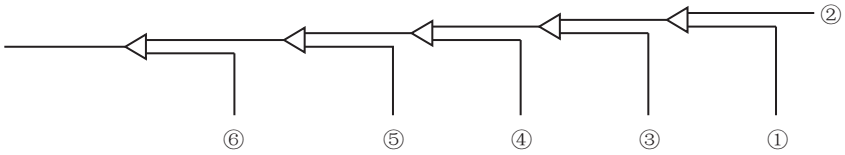
   b. Carry out vacuum drying operation (see vacuum drying of TVR™ II refrigerant piping in detail).

   c. Shut down nitrogen main valve.

   d. Repeat above operations to the connected copper pipe of all indoor units.

   e. Sequence of flushing: when pipeline has been connected to system, sequence of flushing is from far to near. That is, in light of principal unit, flushing from the farthest pipe opening to principal unit in turn (i.e. ①-②-③-④-⑤-⑥).

Figure 44



⚠ CAUTION

When flushing one pipe opening, block all pipe openings which are connected to this opening.

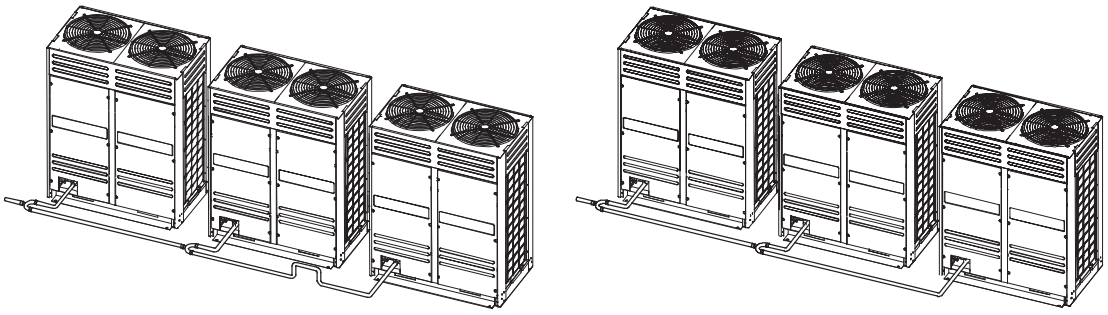
   f. After finishing flushing, seal soundly all openings linked with atmosphere to prevent the entering of dust, trash and moisture.

- **Installation highlight of pipe system**

1. Pipe between outdoor units must be installed horizontally, and the connecting pipe between those pipes shall not drop downward.
2. All pipes between outdoor units cannot be higher than the outdoor units' outlet.

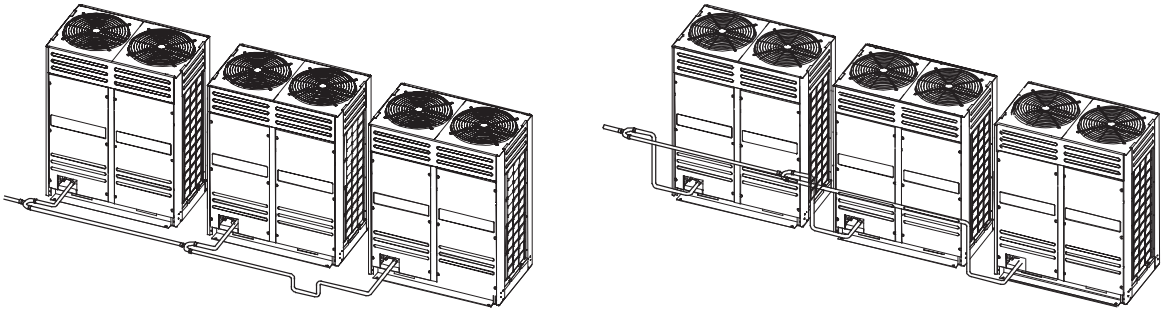
   The right installation type:

Figure 45



The wrong installation type:

Figure 46



Air Tight Test

Purpose and operation procedure of air tightness test

- **Purpose**

  Search leak source so as to prevent malfunction of the system due to leakage of refrigerant.

- **Operation tips**

  Subsection detection, overall pressure-keeping, grading pressurization.

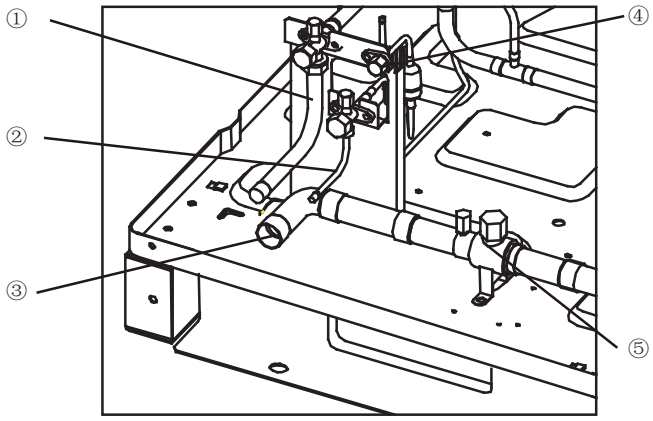
- **Operation procedure**

  1. After piping of indoor unit has been connected, weld port of high-pressure side piping.
  2. Weld low-pressure side piping with connector for pressure gauge together.
  3. Charge nitrogen slowly into pressure gauge connector to conduct air tightness test.
  4. After making sure the air tightness test is qualified, weld low-pressure ball valve with low-pressure side piping and connect high-pressure valve with high-pressure side piping.

Note:

It is forbidden to charge nitrogen through ball valve after connecting low-pressure side piping with ball valve, that is, pressurizing ball valve directly is not allowed, otherwise ball valve shall be damaged and nitrogen shall leak into outdoor unit system through the ball valve.

Figure 47



①	Connect the liquid pipe (accessory, field installation)
②	Oil balance
③	Connect the gas pipe
④	Gauge point
⑤	Low pressure ball valve

Operation of air tightness test

- **Operation procedure**

1. When conducting air tightness test, make sure that gas pipe and liquid pipe are kept in full-shut status; otherwise, nitrogen might enter the circulation system of outdoor unit. Both gas valve and liquid valve need to be strengthened before pressurization.
2. Each refrigerant system shall be slowly pressurized from the two sides of gas pipe and liquid pipe.
3. Make use of dry nitrogen as medium to conduct air tightness test. Phase-in control diagram of pressurization is as follows:

Table 24

No.	Phase (phase-in pressurization)	Criteria
1	Phase 1: appear large leakage after over three minutes of pressurization with 3.0kgf/cm^2.	No pressure drop after modification
2	Phase 2: appear major leakage after over three minutes of pressurization with 15.0kgf/cm^2.	
3	Phase 3: appear small leakage after over 24 hours of pressurization with R410A: 40.0kgf/cm^2.	

- **Pressure observation**

1. Pressurize to regulated value and maintain 24 hours. When modifying pressure according to variation of temperature, it is qualified if pressure drop does not happen. If pressure falls, find out the leak source and modify it.
2. Modification method

   When ambient temperature difference is ±1°C, the pressure difference shall be ±0.1 kgf/cm^2.

   Modification formula: Real value=pressure of pressurization+ (temperature of pressurization-temperature during observation) x 0.1 kgf/cm^2.

   You can find out whether the pressure drops or not by comparing the modification value with pressurization value.
3. General ways for searching leak source.

   Conduct detection through three phases; find out leak source when pressure drop happens.

   A. Audition detection-hear large leakage sound

   B. Hand-touching detection-place hand at the joint of pipeline to feel whether there is leakage

   C. Soap water detection-bubbles shall burst out from leak source.

   D. Detection by use of halogen leak detector.

      Using halogen leak detector when finding out pressure drop but could not find the leak source.

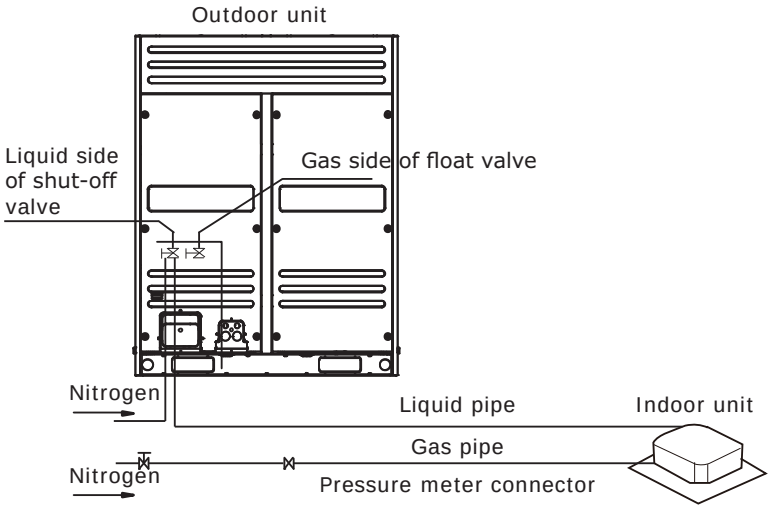
a. Keep nitrogen at 3.0kgf/cm^2.

b. Supplement refrigerant to 5.0kgf/cm^2.

c. Use halogen leak detector, methane leak detector and electric leak detector for detection.

d. If the leak source still could not be found, continuously pressurize to 40.0kgf/cm^2 (R410A) and then detect again.

Figure 48



⚠ CAUTION

- The air tightness test is conducted by pressurize nitrogen (R410A system: 40kgf/cm^2).
- It is not allowed to adopt oxide, flammable gas and toxic gas to conduct air tightness test.
- Before pressure-keeping reading, let it rest for several minutes till pressure is stable, to record temperature, pressure value for future modification.
- After pressure-keeping is over, release system pressure to 5~8 kgf/cm^2 and then conduct pressure-keeping and storage.
- If pipeline is too long, conduct phase-in detection.

  a. Inner side of pipeline

  b. Inner side of pipeline+upright

  c. Inner side of pipeline+upright+outer side of pipeline

Vacuum Drying

Purpose and highlights of vacuum drying

- **Purpose of vacuum drying**

  1. Dehumidify the system to prevent ice-blockage and copperizing, otherwise abnormal operation or compressor damage will be caused.
  2. Eliminating the non-condensable gas of system to prevent oxidizing components, system pressure fluctuation, and bad heat exchanging during the system operation.
  3. Detect leak source from reverse rotate.

- **Selection of vacuum pump**

  1. The limit of vacuum degree is below -756mmHg.
  2. The discharge of vacuum pump is over 4l/s.
  3. The precision of vacuum pump is over 0.02mmHg.

  Highlights of R410A system:

  After the vacuum process of R410A refrigerant circulation is over, vacuum pump stops running and the lubricant in vacuum pump shall flow back to air conditioning system, for the inner of pump soft pipe is in vacuum status. In addition, same situation shall happen if vacuum pump suddenly stops during operation. At this moment, different oils will mix, which induce the refrigerant circulating system to malfunction, so it is recommended to use one-way valve to prevent reverse flow of oil in vacuum pump.

- **Vacuum drying for pipe**

  Vacuum drying: Use vacuum pump to make the moisture (liquid) in pipeline change into steam, which will eliminate the moist of the pipeline and keep drying of pipe inner. Under atmospheric pressure, water's boiling point (steam temperature) is 100°C, while its boiling point will decline when using vacuum pump reduce the pipeline pressure to vacuum. When the boiling point declines under outdoor temperature, moisture in pipe shall be evaporated.

Table 25

Boiling Point of Water (°C)	Air Pressure (mmHg)	Vacuum Degree (mmHg)	Boiling Point of Water (°C)	Air Pressure (mmHg)	Vacuum Degree (mmHg)
40	55	-705	17.8	15	-745
30	36	-724	15	13	-747
26.7	25	-735	11.7	10	-750
24.4	23	-737	7.2	8	-752
22.2	20	-740	0	5	-755
20.6	18	-742			

Operation procedure for vacuum drying

- **Methods of vacuum drying**

  According to different construction environment, there are two kinds of vacuum drying ways: ordinary vacuum drying and special vacuum drying.

  1. Ordinary vacuum drying

     A. Firstly, connect the pressure gauge to the infusing mouth of gas pipe and liquid pipe, keep vacuum pump running for above 2 hours, and it is satisfactory that vacuum degree of vacuum pump is below -755mmHg.

     B. If the vacuum degree of vacuum pump could not be below -755mmHg after 2 hours of drying, system will continue drying for one hour.

     C. If the vacuum degree of vacuum pump could not be below -755mmHg after 3 hours of drying, please check the system leakage source.

     D. Vacuum placement test: when the vacuum degree reaches -755mmH, keep rest for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture and leak source.

     E. Vacuum drying shall be conducted from liquid pipe and gas pipe simultaneously. There are a lot of functional parts like valves, which could shut down the gas flow midway.

  2. Special vacuum drying

     This kind of vacuum drying method shall be adopted when:

     A. Finding moisture during flushing refrigerant pipe.

     B. Construction period is long, and rain water might penetrate into pipeline.

        Procedures of special vacuum drying are as follows:

        a. The first vacuum drying for 2 hours.

        b. The second vacuum damage, filling nitrogen to 0.5Kgf/cm^2.

           Because nitrogen is dry gas, vacuum damage could achieve the effect of vacuum drying, but this method could not achieve drying thoroughly when there is too much moisture. Therefore,special attention shall be drawn to prevent the entering of water and the formation of condensate water.

        c. The second vacuum drying for 1 hour.

           It is qualified when vacuum degree is under -755mmHg; if the vacuum degree is still above -755mmHg within 2 hours drying, please repeat the procedures of “vacuum damage-vacuum drying”.

        d. Vacuum placement test: when the vacuum degree reaches -755mmHg, keep rest for 1 hour. It is qualified if the indicator of vacuum does not go up. But it will go up in the case that there is moisture and leak source.

Recharge of Refrigerant

Operation procedure for recharging refrigerant

- **Operation procedure**

  Calculate the required refrigerant volume by the length of liquid pipe→Recharge refrigerant.

  Remark: The refrigerant volume from factory does not include the recharged amount of the pipeline extending.

- **Detailed steps for recharging refrigerant**

  1. Make sure vacuum drying is qualified before recharging refrigerant.
  2. Calculate the required refrigerant volume by the dia. and the length of liquid pipe.
  3. Use electronic scale or fluid infusion apparatus to weight the recharged refrigerant volume.
  4. Use soft pipe to connect refrigerant cylinder, pressure gauge, and examine valve of outdoor unit. And recharge with liquid mode. Before recharging, eliminate the air in the soft pipe and pressure gauge's pipe.
  5. After finishing the recharging, by the gas leak detector or soap water, to detect whether there is refrigerant leakage in expansion part of indoor and outdoor units.
  6. Write the recharged refrigerant volume in the indicating plate of outdoor unit.

⚠ CAUTION

- The recharged refrigerant volume must be calculated according to the formula in the technical reference of outdoor unit. It isn't allowed to calculate by running current, pressure and temperature. Because current and pressure is changeable due to the difference of temperature and length of pipeline.
- In the cold ambient, use warm water and hot wind to warm up refrigerant storage cylinder, and don't allow heating up directly by flame.

- **Recharging of R410A refrigerant**

  If R410A refrigerant is adopted, the tool shall be different. Confirm the following items before Recharged:

  1. The different vacuum pump with one-way valve.
  2. The different pressure gauge: the nut of connector and pressure scale are different.
  3. The different recharging soft pipe and connector.
  4. The charging method is different. Recharge into the outdoor unit with liquid phase.
  5. The different leak detector.

Calculating the recharged refrigerant volume

Calculate the recharged refrigerant volume by the length and dia. of liquid pipe of indoor units

Table 26

Diameter of Liquid Pipe	Equivalent Refrigerant for Pipe Length of 1m (kg/m)	Diameter of Liquid Pipe	Equivalent Refrigerant for Pipe Length of 1m (kg/m)
Φ6.4	0.023	Φ19.1	0.270
Φ9.5	0.060	Φ22.2	0.380
Φ12.7	0.120	Φ25.4	0.520
Φ15.9	0.170	Φ28.6	0.680

Calculating formula (R410A):

The recharged volume: R (Kg) = (L1×0.023 kg/m) + (L2×0.060 kg/m) + (L3×0.120 kg/m) + (L4×0.180 kg/m) + (L5×0.270 kg/m) + (L6×0.380 kg/m) + (L7×0.520kg/m) + (L8×0.680kg/m)

L1: Actual total length of Φ6.4 liquid pipe (m); L2: Actual total length of Φ9.5 liquid pipe (m);
L3: Actual total length of Φ12.7 liquid pipe (m); L4: Actual total length of Φ15.9 liquid pipe (m);
L5: Actual total length of Φ19.1 liquid pipe (m); L6: Actual total length of Φ22.2 liquid pipe (m);
L7: Actual total length of Φ25.4 liquid pipe (m); L8: Actual total length of Φ28.6 liquid pipe (m)

Drain Pipe Engineering

Installation Highlights of Drain Pipe

Installation principle of Drain pipe:

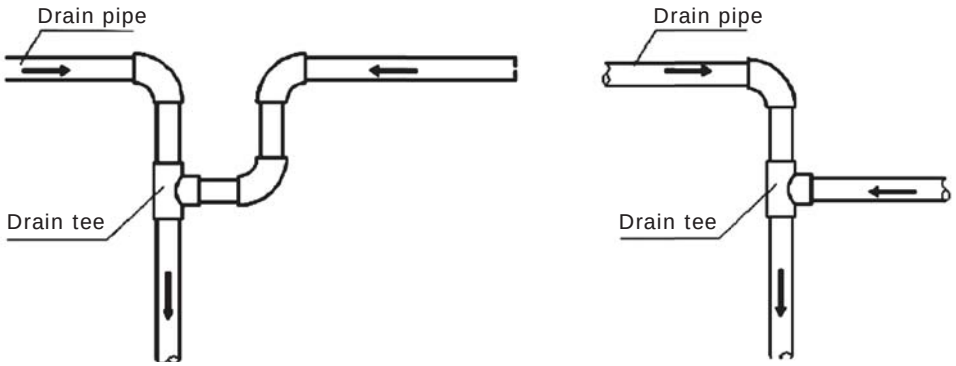
1. Slope;
2. reasonable pipe diameter;
3. nearby discharge

Installation highlights of Drain pipe:

1. Before installing condensate water pipeline, determine its route and elevation to avoid intersection with other pipelines and ensure slope is smooth and straight.
2. Make sure that the two horizontal fluid pipes shall avoid encountering, and preventing flow backwards and drainage difficulty.

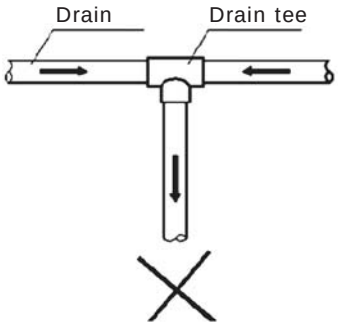
   a. Correct connection

Figure 49



b. Incorrect connection:

Figure 50



Advantages of correct connection:

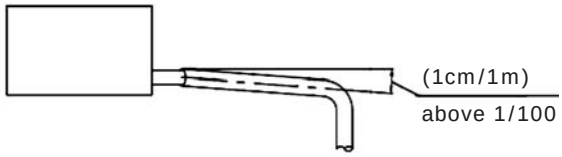
1. Do not cause flow backwards of one pipe.
2. The slope of two pipes can be regulated separately.

Disadvantages of incorrect connection:

1. Interfere drainage.
2. The side of branch pipe with large quantity of fluid volume will flow to the side with small quantity, thus leading to the water backwards of branch pipe with small quantity.
3. Suspender gap:

   In general, the horizontal gap is 0.8m-1m and the vertical gap is 1.5m-2.0m. Each vertical pipe shall be equipped with no less than two suspenders. Overlarge suspender gap for horizontal pipe shall create bending, thus leading to air resistance.
4. The highest point of drain pipe shall be designed with air hole to ensure that condensate water could be discharged smoothly. The outlet air hole shall face down to prevent dirt entering pipe.
5. After finishing connection, conduct water passing test and overflowing water test to pipelines to check the smoothness of drainage and leakage of pipeline system.
6. Use specific glue to adhesive the seam of thermal insulation materials, and then bind with rubber or plastics adhesive tape. The width of the adhesive tape shall not be less than 50mm to ensure fastness and prevent condensation.
7. The drain pipe of air conditioner shall be installed separately with other waste pipe, rainwater pipe and other drain pipe in building.
8. The slope of drain pipe shall be kept above 1/100.

Figure 51

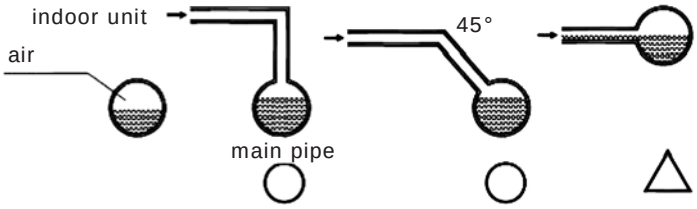


9. In case 1/100 slope is unavailable, consider to use larger-sized pipe and use its dia. to create slope.

10. Conflux towards horizontal pipe shall come from upside as much as possible. If it comes from transverse route, reflux is easy to be created.

11 .The end of drain pipe shall not contact with ground directly.

Figure 52

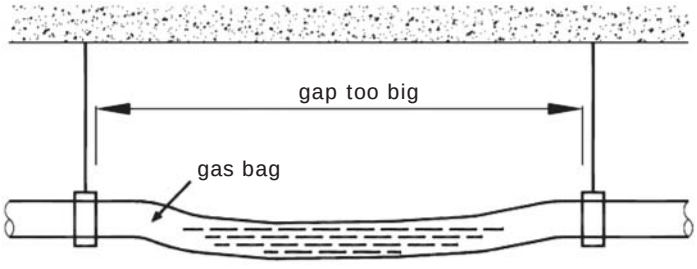


⚠ CAUTION

- The drain pipe diameter shall meet the draining requirement of indoor unit.
- The outlet air vent cannot be installed nearby the lifting pump of the indoor unit.
- Check whether condensate water pump can be started up and shut down nornnally by infusing water into the water-containing plate of indoor unit and powering on.
- All joints shall be firm (particularly PVC pipe).
- The drain pipe is not allowed to turn to adverse slope, horizontal, and bending.
- Dimension of drain pipe shall be no less than the connecting mouth size of drain piping to indoor unit.
- Work out thermal insulation of drain pipe, otherwise it is easy to produce condensation. Thermal insulation processing shall be continued to the connecting part of indoor unit.
- Indoor units with different draining pattern shall not share the same concentrated drain pipe.
- Discharge of condensate water cannot influence normal life and working of other people.
- As for long drain pipe, hanging bolt shall be used to ensure 1/100 slope without bending PVC pipe.

  The support gap of horizontal pipe is 0.8-1.0m. If the gap is too large, it shall produce bending and air resistance, while air resistance could seriously influence smoothness of water flow to cause abnormal water level as shown in following figure:

Figure 53



Water Storing Elbow of Drain Pipe

To indoor unit with large negative pressure at the outlet of water-containing plate, the drain pipe must be equipped with water storing elbow.

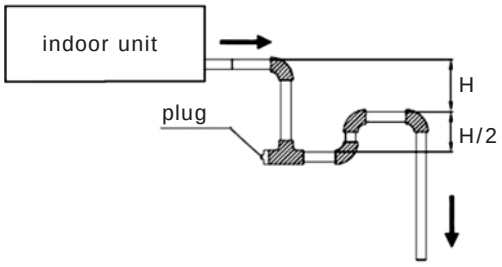
- **Function of water storing elbow:**

  When indoor unit is in motion, prevent generating negative pressure to cause drainage difficulty or blow water out of the air outlet.

- **Installation of water storing elbow:**

  1. Install water storing elbow as shown in following figure: H shall be above 50mrn.
  2. Install one water storing elbow for each unit.
  3. Taken convenience for future clean into consideration during installation.

Figure 54



Concentrated Drain Pipe

Pipeline diameter of concentrated drain pipe

Select drain pipe diameter according to indoor unit's combined flow volume. E.g. If one 1HP unit with 2l/h discharging condensate water, the calculation of the combined flow volume of three 2HP units and two 1.5HP units is: 2HP x 2l/h x 3 +1.5HP x 2l/h x 2=18l

Relation between horizontal pipeline diameter and permitted displacement of condensate water

Table 27

PVC piping	Inner diameter of piping (reference value: mm)	Inner diameter of piping (mm)	Permitted displacement (l/h)		Remark
			Slope 1:50	Slope 1:100	
PVC25	19	20	39	27	(Reference value) could not be used for confluence pipe
PVC32	27	25	70	50	
PVC40	34	31	125	88	Could be used for confluence pipe
PVC50	44	40	247	175	
PVC63	56	51	413	334	

Attention: through converge point need use PVC40 or larger pipe.

Relation between vertical pipeline diameter and displacement of condensate water

Table 28

PVC piping	Inner diameter of piping (reference value: mm)	Inner diameter of piping (mm)	Permitted displacement (l/h)	Remark
PVC25	19	20	220	(Reference value) could not be used for confluence pipe
PVC32	27	25	410	
PVC40	34	31	730	Could be used for confluence pipe
PVC50	44	40	1,440	
PVC63	56	51	2,760	
PVC75	66	67	5,710	
PVC90	79	77	8,280	

Attention: through converge point need use PVC40 or larger pipe.

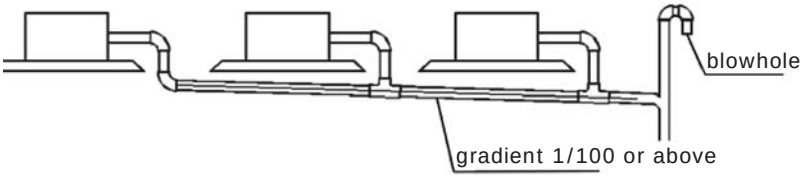
Operation process of concentrated drain

Install indoor unit→connect drain pipe→water passing test and overflowing water test→thermal insulation of drain pipe

⚠ CAUTION

- Increase drainage point as much as possiblle and reduce quantity of connected indoor units, to ensure horizontal main drain pipe not be too long.
- Units with drain pump and natural drainage shall converge to different drainage system separately.
- Add two elbows at air outlet, and make sure its mouth faces down to prevent dirt and so on dropping into pipe to create blockage.

Figure 55

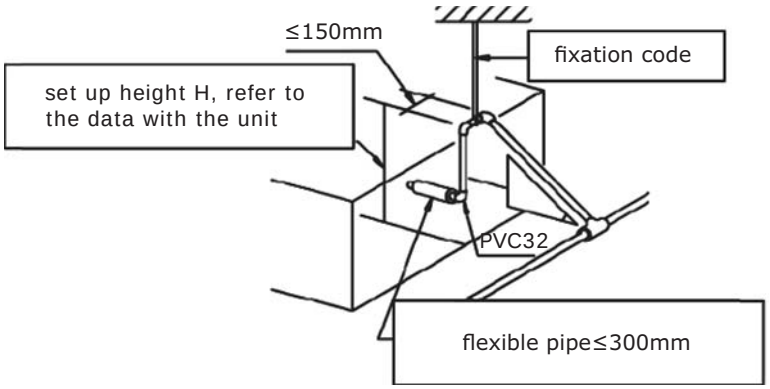


Lifting of Drain Pipe (for the unit with lift pump)

Installation of lift pipe

- When connecting drain pipe with indoor unit, use pipe clamp shipped with unit to fix. Glue splicing is not permitted for ensuring convenience in repairing.
- To ensure 1/100 slope, total lift height of drain pipe (H) shall depend on indoor unit's pump, and do not set vent pipe on the lifting pipe section. After lifting vertically, immediately place down inclined, otherwise it will cause error operation of switch at water pump. The connecting method is shown as follows:

Figure 56



Note:

Air outlet could not be installed on the lifting part; otherwise water shall be discharged to ceiling or could not be discharged.

Overflowing Water Test and Water Passing Test

Overflowing water test

After finishing the construction of drainage pipe system, fill the pipe with water and keep it for 24 hours to check whether there is leakage at joint section.

Water passing test

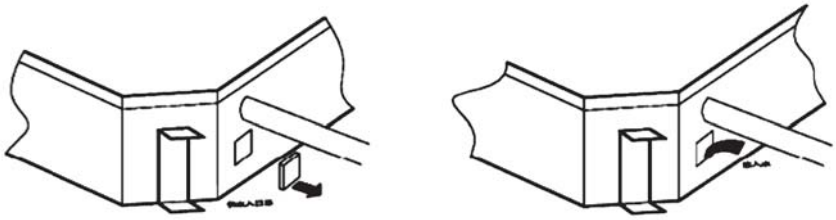
- **Natural drainage mode**

  Infuse water-containing plate with above 600ml water through check port slowly, and observe transparent hard pipe at drainage outlet to confirm whether it can discharge water.

- **Pump drainage mode**

  1. Remove plug of water level switch, remove water-finding cover and slowly infuse water-containing plate with about 2,000ml water through water-finding port to prevent touching the motor of drainage pump.

Figure 57



  2. Power on and let the air conditioner operate for cooling. Check operation status of drainage pump, and then turn on water level switch, check operation sound of pump and observe transparent hard pipe at drain outlet to confirm whether it can discharge water. (In light of the length of drainage pipe, water shall be discharged after delaying about 1 minute)
  3. Stop the operation of air conditioner, turn down power supply and put water-finding cover to the original place.
     a. After stopping the operation of air conditioner, check whether there is something abnormal 3 minutes later. If drain pipe have not been distributed properly, over back-flow water shall cause the flashing of alarm indicator at remote-controlled receiving board and even water shall run over the water-containing plate.
     b. Continuously add water until reaching alarm water level, check whether the drain pump could discharge water at once. If water level does not decline under warning water level 3 minutes later, it shall cause shutdown of unit. When this situation happens, normal startup shall be carried out by turning down power supply and eliminating accumulated water.

Note:

Drain plug at the main water-containing plate is used for eliminating accumulated water in water-containing plate when maintaining air conditioner fault. During normal operation, the plug shall be filled in to prevent leakage.

Duct Engineering

Fabrication of Duct

- The material, specification, performance and thickness of metal duct should be in accordance with the relevant regulations of present National Products Standard. The thickness of steel sheet or galvanized steel sheet should not be less than the regulation in table below:

  Thickness of steel sheet duct (mm)

Table 29

Diameter (D) or edge length (b) of duct	Circular duct	Rectangle duct	
		Medium / low pressure system	High pressure system
D (b)≤320	0.5	0.5	0.75
320D<D (b)≤450	0.6	0.6	0.75
450D<D (b)≤630	0.75	0.6	1.0
630D<D (b)≤1,000	0.75	0.75	1.0
1,000D<D (b)≤1,200	1.0	1.0	1.0

- The material, specification, performance and thickness of non-metal duct should be in compliance with design and regulations of present National Products Standard.
- The body, frame, fixing material and sealed cushion of fire-proof air duct shoulld be made of non-combustible materials, fire resistance rating of which should be in accordance with the design requirement.
- The sheathing of composite duct should be made of non-combustible materials. Inner insulation material should be no burning or burning retardant with rating B1, and no harm to people's body.
- The permitting deviation to outer diameter ar long edge of duct: when no more than 300mm, it is 2mm; when more than 300mm, it is 3mm. The permitting deviation of pipe end flatness is 2mm. Discrepancy between two diagonal lines of rectangle duct shall not be more thane 3mm. Discrepancy between two diameters of any cross-cut circular flange shall not be more than 2mm.

Connection of Duct

Connection of metal duct

- The seam of duct board splice should be stagger and cross-seam is not allowed.

1. Specification of metal duct flange shall not be less than the data as shown in table below.

Specification to flange and bolt of circular metal duct (mm)

Table 30

Diameter of duct (D)	Specification of flange		Specification of bolt
	Flat steel	Angle steel	
D≤140	20×4	–	M6
140<D≤280	25×4	–	
280<D≤630	–	25×3	
63Q<D≤1,250	–	30×4	M8
1250<D≤2,000	–	40×4	

Specification to flange and bolt of rectangle metal duct (mm)

Table 31

Dimension of long edge of duct (b)	Specification of flange (angle steel)		Specification of bolt
B≤630	20×4	25×3	M6
630<b≤1,500	25×4	30×3	M8
	–	40×4	
2,500<b≤4,000	–	50×5	M10

2. Diameter of bolt and rivet to duct flange for medium/low pressure system should be no more than 150mm.
3. As for duct of high pressure system, it should be no more than 100mm.
4. Four angles of rectangle duct flange should be designed with screw hole.
5. When improving the strength of duct flange position by adopting reinforcement method, the applied condition corresponding to flange specification could be extended.

- Connection of nonmetallic duct

  Specification of flange should be in accordance with standard, gap of bolt hole should be no more than 120m. Four angles of rectangle duct flange should be designed with screw hole.

- Strengthening of metal duct

  When edge length of rectangle duct is more than 630mm, edge length of insulation duct is more than 800mm and length of pipe section is more than 1,250mm, or single-edge level area of low pressure duct is more than 1.2m^2 and single-edge level area of high/medium pressure duct is more than 1.0m^2, strengthening measures should be conducted.

- Strengthening of nonmetallic duct

  When diameter or edge length of HPVC duct is more than 500mm, the joint section of duct and flange should be equipped with strengthening board and the gap should not be more than 450mm.

Connecting Highlights of Duct

- Supporting, hanging and mounting bracket should be made of angle steel. Position of expansion bolt should be correct, firm and reliable. The buried part could not be painted and oil pollution should be eliminated. Gap should be in accordance with regulation below:

  1. If duct is installed horizontally, gap should be no more than 4m when diameter or edge length is less than or equal to 400mm, while the gap should be no more than 3m when diameter or edge length is more than 400mm.
  2. If duct is installed vertically, gap should be no more than 4m and make sure there are at least 2 fixed points on single straight pipe.

- Supporting, hanging and mounting bracket could not be installed at air opening, valve, checking door and automatically controlled device, and distance to air opening or plugged tube shall not be less than 200mm.
- Hanging bracket should not be hung above flange.
- Thickness of flange gasket should be 3-5mm. Gasket should be flat on flange and inserting to pipe is not allowed. Set up fixed points at proper place for hanging pipe to prevent vibration.
- Vertical splice seam of duct should be stagger. Make sure there is no vertical seam at the bottom of duct installed horizontally. As for the installation of flexible short duct, keep proper tightness and ensure there is no distortion.
- All metal parts (including supporting, hanging and mounting bracket) on pipeline system engineering should be conducted with anti-corrosion treatment.

Installation of Assembly

- The regulating device of duct should be installed in place where it is easy and reliable for operation.
- The air port should be installed firmly and air pipe should be connected tightly. Frame should be tightly contact with decorate of building.The appearance should be smooth and flat, and regulation is flexible.
- If air port is installed horizontally, deviation level should be no more than 3/1,000. If air port is installed vertically, deviation of perpendicular should be no more than 2/1,000.
- The same air port in same room should be installed at the same height, and put in order.

Heat Insulation Engineering

The insulation of refrigerating equipment and pipe is carried out through general insulation method, which binding the equipment and pipe with solid multi-hole insulation material and exploiting proper wet-proof and protection measures, called insulation structure. The form of insulation structure shall be different in light of different insulation materials. This is a traditional insulation method which is adopted very early. Although its insulation performance is general, but it is simple in structure, convenient in construction and cheap in price, so it is widely used in refrigeration engineering.

Insulation of Refrigerant Piping

Operational procedure of refrigerant piping insulation

Construction of refrigerant pipe→insulation(excluding connecting section)→test for air sealing→connecting section insulation.

Connecting section: for instance, insulation construction just could be carried out after air tightness test at welding area, opening expending area and flange joint is successful.

Purpose of refrigerant piping insulation

- During operation, temperature of gas pipe and liquid pipe shall be over-heating or over-cooling extremely. Therefore, it is necessary to carry out insulation; otherwise it shall influence the performance of the unit or cause burn of the compressor.
- Gas pipe temperature is very low during cooling. If insulation is not enough, it shall form dew and cause leakage.
- Temperature of outlet pipe (gas pipe) is very high (generally 50-100°C) during heating. Careless touch shall cause hurt, so it is necessary to take insulation measures to avoid getting hurt.

Selection of insulation materials for refrigerant piping

Adopt hole-closed foam insulation materials with level B1 of burning retardant and over 120°C of constant burning performance.

Thickness of insulation layer

- When outer diameter of copper pipe (d) is less than or equal to 12.7mm, the thickness of insulation layer (δ) shall be above 15mm.

  When outer diameter of copper pipe (d) is more than or equal to 15.88mm, the thickness of insulation layer (δ) shall be above 20mm.
- In hot and wet environment, the above recommended value shall be increased one time.

Note:

The outdoor pipeline shall be protected by metal case to proof sunshine, storm and air erosion, and prevent damage of external force or man-made destroy.

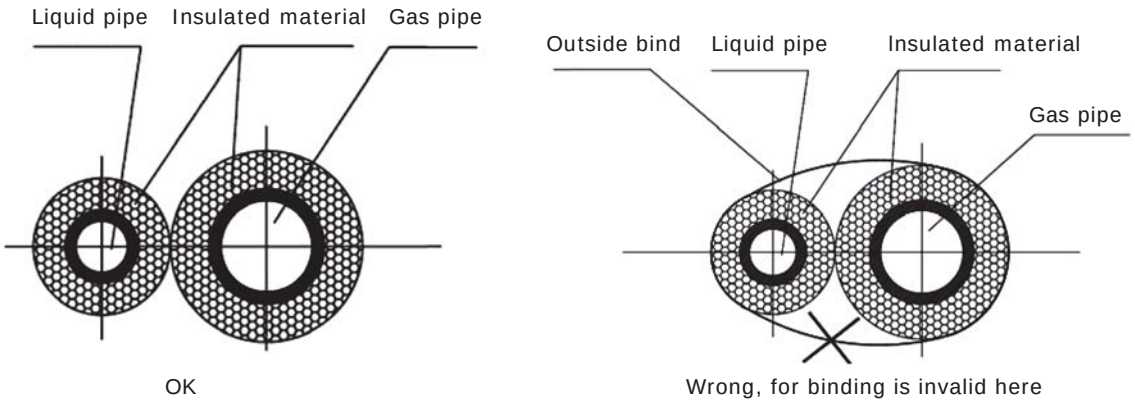
Installation and highlights of insulation construction

- Example of wrong operation:

  Carry out insulation for gas pipe and liquid pipe together, which would cause bad performance of the air conditioner.
- Example of correct operation:

  1. Carry out heat insulation for gas pipe and liquid pipe separately.

Figure 58

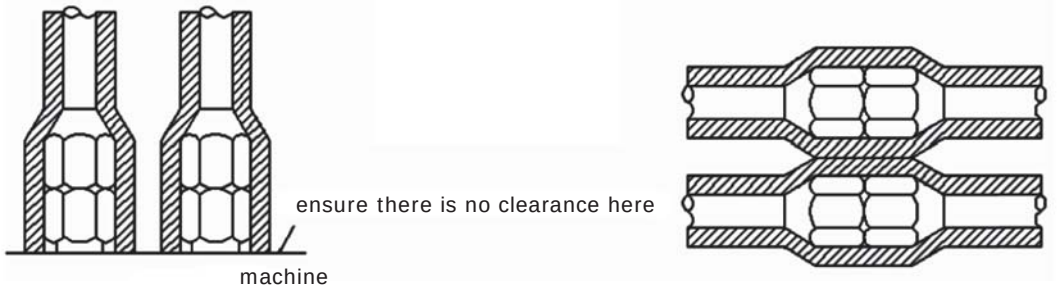


Note:

After carry out heat insulation for gas pipe and liquid pipe separately, bind them with tape. Be careful not to bind them over tightly; otherwise, the spliced insulation joint shall be damaged.

2. The surrounding of pipe connecting section shall be carried out insulation entirely.

Figure 59

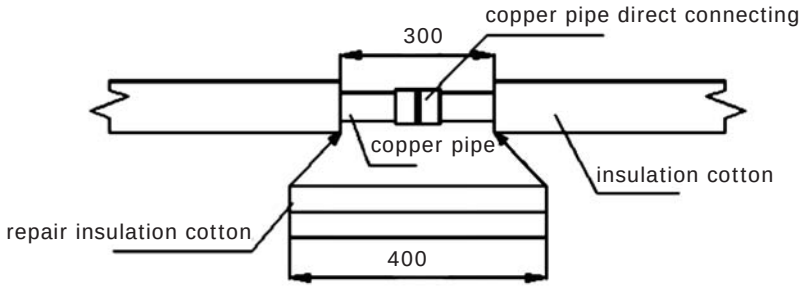


Highlights:

1. No gap in joint of insulation materials.
2. If the joint of insulation materials is linked tardily and tape is bound over tightly, shrinkage and leakage shall be caused easily and thus result in the phenomena of dew-drop. The over-tightened tape shall edge out air in material, leading to decrease the insulation effect at this part; meanwhile tape shall be easily aged and drop down.
3. In indoor shield space, it is unnecessary to bind belting to eliminate any influence upon the insulation effect.

   Correct repairing method for insulation cotton: (see the figure below)

Figure 60



Firstly cut out the material longer than gap, expend the two ends and embed the insulated cotton, and finally paste joint with glue.

Highlights of insulation repairing:

1. Repaired length of insulation (insulation tube with filled gap) shall be 5-10cm longer than the length of gap under natural status.
2. Sliver the cut of insulation to be repaired and cross-section shall be even.
3. Insert gap with insulation for repairing and cross-section shall be pressed tightly.
4. All cross-section and cut need to be pasted with glue.
5. Finally, bind the seam with rubber/plastic tape.
6. Prohibit conducting insulation by using bindler fabric in concealed section, so as to avoid influence upon insulation effect.

Insulation of Condensate Water Pipe

Insulation of condensate water pipe

- Select rubber/plastic tube with burning retardant of rating B1.
- Thickness of insulation layer is usually above 10mm.
- The insulation material at water outlet of unit body should be pasted to avoid dewing and dripping.
- Pipe installed in wall shall not conduct insulation.
- Use specific glue to paste the seam of insulation material, and then bind with cloth tape. The width of tape shall not be less than 5cm. Make sure it is firm and be careful of dewing.

Insulation of Duct

Insulation of duct

- Insulation of duct parts and equipment should be conducted after confirming that the leakage test and quality of duct is qualified.
- Usually make use of centrifugal glass cotton, rubber/plastic material or other late-model insulation duct to conduct insulation.
- Insulation layer should be even and tight. Crack, gap and other defects are not allowed.
- The supporting, hanging and mounting bracket of duct should be set up to the outside of insulation layer, and insert bed timber between bracket and duct.
- Thickness of insulation layer

  1. As for the inlet and outlet duct installed in room without air conditioner, the thickness of insulation layer should be above 40mm when adopting centrifugal glass cotton for insulation.
  2. As for the inlet and outlet duct installed in room with air conditioner, the thickness of insulation layer should be above 25mm when adopting centrifugal glass cotton for insulation.
  3. When adopting rubber/plastic material and other materials, the thickness of insulation layer should be in accordance with design requirement or calculation.

Electrical Engineering

Please refer to "Part 3. Outdoor Units Specification & Performance"

Highlights of electrical installation

- Purchased wiring, parts and materials should be in compliance with the local and national regulations.
- All field wiring construction should be finished by qualified electrician.
- Air conditioning equipment should be grounded according to the relevant local and national electrical regulations.
- Current leakage protection switch should be installed (select current leakage breaker in light of the 1.5-2 times of total loading rated current.)
- When connecting wiring and wire holder, use cable clamp to fix and make sure there is no exposure.
- Refrigerant piping system and wiring system of indoor and outdoor unit belong to the different system.
- Do not connect the power wire to the terminal of signal wire.
- When power wire is parallel with signal wire, put wires to their own wire tube and remain proper gap (the current capacity of power wire is: 10A below 300mm, 50A below 500mm).
- Voltage discrepancy of power wire terminal (side of power transformer) and end voltage (side of unit) should be less than 2%. If its length could not be shortened, thicken the power wire. Voltage discrepancy between phases shall not pass 2% rated value and current discrepancy between highest and lowest phase should be less than 3% rated value.

Selection of wiring

The selection of wiring area shall in accordance with the requirements below:

- Voltage lose of wire shall meet the requirement of terminal voltage for normal operation and startup.
- The wiring current-carrying capacity determined by installed method and environment should be no less than the largest current of unit.
- Wiring shall ensure the stability of movement and heating.
- The smallest sectional area should meet the requirement of mechanical strength.

Table 32

Sectional area of core to phase line S (mm^2)	Smallest sectional area of PE line (mm^2)
S≤16	S
16<S≤35	16
S>35	S/2

When earth protection line (shortly called PE line) is made of material the same as phase line, the smallest sectional area of PE line should be in accordance with the regulation below:

Sectional area of core to phase line S (mm^2) Smallest sectional area of PE line (mm^2).

Distribution highlights of distribution wiring.

- When distributing wiring, select wirings with different colors for phase line, zero line and protection earth according to relevant regulations.
- The power wire and control wire of concealed engineering is prohibited to bind together with refrigerant piping. It is necessary to pass through wire tube and distributed separately, and the gap between control line and power wire should be 500mm at least.
- When distributing wiring by passing through pipe, the following should be paid attention to:

1. Metal wire tube could be used in indoor and outdoor, but it is not suitable to be exposed to acid-alkali corrosion.
2. Plastic wire tube is generally used in indoor and place with corrosion, but it is not suitable to be exposed to mechanical damage.
3. The wiring through pipe shall not be in the form with ends jointing. If joint is a must, connection box should be installed at the corresponding place.
4. The wiring with different voltage should not pass through the same wire tube.
5. Total sectional area of wiring through wire tube shall not exceed 40% valid area of stuffing tube.
6. Fixing point of wire tube support shall follow the standard below:

Table 33

Nominal diameter of wire tube	Largest gap between fixed points of wire tube	
(mm)	Metal pipe	Plastic pipe
15~20	1.5	1
25~32	2	1.5
40~50	2.5	2

Nominal diameter of wire tube Largest gap between fixed points of wire tube.

Control System and Installation.

Connecting highlights of control line (RS485 communication).

1. The control line should be shielded wire. Other wiring shall create signal interference, thus leading to error operation.
2. Single end to shield net of shielded wire should be grounded.

Note:

The shield net should be grounded at the wiring terminal of outdoor unit. The inlet and outlet wire net of indoor communication wire should be connected directly and could not be grounded, and form open circuit at the shield net of final indoor unit.

3. Control wire could not be bound together with refrigerant pipeline and power wire. When power wire and control wire is distributed in parallel form, keep gap between them above 300mm so as to prevent signal interference.
4. Closed loop is forbidden to form for the control wire.
5. Control wire has polarity, so be careful when connecting.

Commissioning and Trial Running

Work before Commissioning

Inspection and confirmation before commission

- Check and confirm that refrigeration pipe line and communication wire with indoor and outdoor unit have been connected to the same refrigeration system. Otherwise, operation troubles shall happen.
- Power voltage is within ±10% of rated voltage.
- Check and confirm that the power wire and control wire are correctly connected.
- Check whether wire controller is properly connected.
- Before powering on, confirm there is no short circuit to each line.
- Check whether all units have passed nitrogen pressure-keeping test for 24 hours with R410A: 40kgf/cm^2.
- Confirm whether the system to commissioning has been completed with vacuum drying and refrigeration package as required.

Preparation before Commissioning

- Calculate the additional refrigerant quantity for each set of unit according to the actual length of liquid pipe.
- Keep required refrigerant ready.
- Keep system plan, system piping diagram and control wiring diagram ready.
- Record the setting address code on the system plan.
- Turn on power switches outdoor unit in advance, and keep connected for above 12 hours so that heater heating up refrigerant oil in compressor.
- Turn on gas pipe stop valve, liquid pipe stop valve, oil balance valve and gas balance valve totally; otherwise, it would cause damage to the unit.
- Check whether the power phase sequence of outdoor unit is correct.
- All dial switches to indoor and outdoor unit have been set according to the Technical Requirement of Product.

Note:

The setting of outdoor unit's dial switch should be conducted under power-off otherwise, the unit shall not identify. The following table shows the address and power of outdoor master and slave unit:

Table 34

ADDRESS dial switch		POWER dial switch	
0	master unit	0	8HP
1	salve unit 1	1	10HP
2	salve unit 2	2	12HP
3	salve unit 3	3	14HP
≤4	Invalid address, system error	4	16HP
——		≥5	Invalid dial switch

Commissioning of Trial Run

Commissioning for trail run of single unit.

- Each independent refrigeration system (i.e. each outdoor unit) should conduct trial operation.
- Detection details of trial run:

1. As for fan in unit, make sure the rotating route of its impeller is correct and impeller turns around smoothly; and there is no abnormal vibration and noise.
2. Check whether there is abnormal noise during operation of refrigerant system and compressor.
3. Check outdoor unit whether it can detect each indoor unit.
4. Check whether drainage is smooth and its lift pump can be in motion.
5. Check whether microcomputer controller can be in motion normally and whether any trouble appears.
6. Check whether operating current is within the allowed range.
7. Check whether each operating parameter is within the range permitted by the equipment.

Note:

When conducting trial run, test cooling and heating mode separately to judge the stability and reliability of system.

Commissioning for the trial run of the paralleled system

- Check and confirm that operation of single unit is normal through trial operation. After confirm it is normal, conduct operation of the whole system, i.e. commissioning of TVR™ II system.
- Commissioning is carried out according to the Technical Requirement of Product. When commissioning, analyze and record operation status so as to understand the operation status of the whole system for convenient maintenance and examination.
- After finishing commissioning, fill out commissioning report in detail. The commissioning report form is shown as follows:

Table 35

Commissioning Report for Trane TVR™ II

Date:_____dd_____mm_____yy

Item name:	
Address:	Tel:
Supplier:	Delivery date: dd mm yy
Installation section:	Principal:
Commissioning section:	Principal:
Remark: recharged refrigeration quantity to system:_____ kg Name of refrigerant:_____(R22, R407C, R410A)	

Installing section:_____ (seal)	Commissioning name:_____ (seal)
Signature:_____	Signature:_____
Date:____dd___mm___yy	Date:____dd___mm___yy

Table 36

Test Data for Test Run of_____System

Model of outdoor unit	Production series no.

Table 37

Operation data of outdoor unit (Cooling)

Unit	No.1		No.2		No.3	
Voltage V						
Total running current A						
Operation current of compressor A						
High-pressure pressure Kg/cm^2						
Low-pressure pressure Kg/cm^2						
Inlet air temperature°C						
Outlet air temperature°C						

Table 38

Operation data of indoor unit

No.	Position	Model	Bar code of indoor unit	Inlet air temperature°C	Outlet air temperature°C
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Table 39

System parameter SW1:
(CHECK)——Used to query outdoor unit data. Check point sequence and corresponding actuality is as follows:

No.	Display content	Note	No.	Display content	Remark
1	ADDR of outdoor unit	0, 1, 2, 3, 4	13	Discharge temp. of inverter compressor	Actual value
2	Cap. of outdoor unit	8, 10, 12, 14, 16	14	Discharge temp. of Fixed No.1 compressor	Actual value
3	Qty .of Modular outdoor unit	Effective to master unit	15	Discharge temp. of Fixed No.2 compressor	Actual value
4	Total cap. of outdoor unit	Cap. need	16	Current of inverter compressor	Actual value
5	Cap. REQT of indoor unit	Effective to master unit	17	Current of Fixed No.1 compressor	Actual value
6	Cap. REQT of master unit after correction	Effective to master unit	18	Current of Fixed No.2 compressor	Actual value
7	Running mode	0, 1, 2, 3, 4	19	Opening degree of EEV	Actual value x8
8	Actual running cap. of outdoor unit	Cap. need	20	Discharge pressure	Actual value x 0.1 MPa
9	Fan status	0, 1, 2, 3, 4, 5, 6, 7, 8, 9	21	The mode limitation of Indoor units	0, 1, 2, 3, 4
10	T2B/T2 average temp	Actual value	22	Quantity of indoor units	Actual value
11	T3 pipe temp	Actual value	23	The latest malfunction or protection	If no, display 00
12	T4 ambient temp	Actual value	24	——	End of query

Note:

When the system has operated for 1 hour stably, press checkup button on PCB of outdoor master unit, query one by one and figure the above table according to facts.

Description of display:

Normal display: when in standby mode, it indicates number of indoor units; when running, it indicates output percentage value of compressor.

Running mode: O-Turn off; 1-fan only; 2-Cooling; 3-Heating; 4-Forced cooling

Outdoor fan speed: 0-OFF; 1-9-Speed increasing in turn; 9-the highest fan level.

PMV opening: pulse=display value x 8.

Number of indoor unit: indoor units which are capable of communicating with outdoor unit normally.

SW2 (CONSTRAINT COOL)-Forced cooling button during commissioning. Once press this button, all the indoor and outdoor units will run at the maximum capacity. It will quit the forced cooling mode and return to the original status 1 hour later.

Part 5 Troubleshooting

Normal Air Conditioner Phenomenon

When white vapor or water appears in the outdoor unit, the reasons might be as follows:

- The fan of outdoor unit stops to begin defrosting.
- The EXV sends out the noise when the defrosting begins and ends.
- There is sound like water flowing when running or off; and the noise enlarges after running for 3 minutes. This is the sound of refrigerant flowing or discharging water gathered by dehumidifying.

Outdoor units send out the noise of "pupu", for temperature changes to heat exchanger or cool compact.

Indoor units sends out odor smell caused by the smell of house, furniture or smoking.

The running light of indoor unit flickers, which may be due to the following reasons:

- Power supply ever failed during during operation.
- For 1-to-several, the following induces the director lighting and the operation stopping
  1. Malfunction of indoor units in cooling mode may be attributed to the influence from other indoor units in heating mode.
  2. Selected mode conflicts with the fixed mode.
  3. Stop fan to prevent discharging cool air.

The "no priority" or "waiting" director light of operation board lights.

Auto run or stop the timer wrong operation.

The unit could not run, which may be due to the following reasons:

- Power is off.
- Manual switch is pulled to off side.
- Fuse is cut.
- Protect device starts, at the same time running director lights.
- Timer's setting time is over, while running director lights.

Heating or cooling is inefficient.

- Filter is blocked by duct or rubbish.
- The place of air deflector is unfit.
- Fan mode is "slight" or running mode is "fan".
- Set temperature is unfit.
- Simultaneously choose the heating and cooling mode, at the time the "no priority" or "waiting" director light of panel lights.

Air Conditioner Protection in Common

Compressor protection.

At the moment of turning on of the power and restart of the machine, outdoor unit will run in 3 minutes to protect the compressor from starting and stopping too frequently.

When the protection device activates and the system stops running, this may be caused by the following issues:

- Forced start and at the same time display lamp lights.
- During operation in cooling mode, the inlet and outlet of outdoor unit are blocked; or outside strong air blows into outlet of the outdoor unit.
- During operation in heating mode, dust adheres to air filter and thus block the inlet or outlet of outdoor unit.

Note:

Please cut power switch manually in the state of protection. And then restart the system after detecting the cause and resolve the problem.

Power fails.

- System will record the failure of power supply during the normal operation.
- When the machine is powered on again, the running light of wired controller would flash to inform users about this.
- Press the on/off key of wired controller to confirm before restart the system.

Note:

Please pull down the power supply switch when the system malfunctions during operation and press the on/off button again as indicated above before restart the machine.

Malfunction Code and Troubleshooting

Please stop the unit and cut power supply if the following phenomenon occur. However, if the problem still insist, please contact the customer service center of Trane and be noted to provide the detailed information on the machine's model and malfunction.

Table 1

Code	Malfunction or protection	remark
E0	Outdoor unit communication malfunction	Only slave unit displays
E1	Phase sequence malfunction	
E2	Communication between prime outdoor unit and indoor units	
E3	reserved	
E4	Ambient temp. sensor malfunction	
E5	reserved	
E6	reserved	
E7	reserved	
E8	Outdoor unit address is wrong	
E9	Voltage malfunction	
H0	Communication malfunction between IR341 and 780034	
H1	Communication malfunction between 0537 and 780034	
H2	Outdoor unit quantities decreasing malfunction	Only master unit displays
H3	Outdoor unit quantities increasing malfunction	Only master unit displays
H4	There are 3 times P6 protection In 30 minutes.	Refer to P6 for repair
H5	There are 3 times P2 protection In 30 minutes.	Refer to P2 for repair
H6	There are 3 times P4 protection In 100 minutes.	Refer to P4 for repair
H9	There are 3 times P9 protection In 30 minutes	Refer to P9 for repair
H7	Indoor unit quantities decreasing malfunction over 3 minutes	
P0	The sensor protection on the top of inv. compressor.	
P1	High pressure protection	
P2	Low pressure protection	
P3	Inv. compressor over current protection	
P4	Discharge temp. sensor protection	
P5	Pipe temp. sensor protection	
P6	Module protection	
P7	Fixed 1 current protection	
P8	Fixed 2 current protection	
P9	Fan module protection	

Code	Malfunction or protection	remark
L0	Module malfunction	
L1	DC generatrix low voltage protection	
L2	DC generatrix high voltage protection	
L3	reserved	
L4	MCE malfunction/simultaneously/cycle loop	
L5	Zero speed protection	
L6	reserved	
L7	Wrong phase protection	
L8	Speed difference >15Hz protection between the front and the back clock	
L9	Speed difference >15Hz protection between the real and the setting speed	

“E0”: Outdoor unit communication malfunction

Outdoor Unit Display

E0 (Slave unit displays only)

Error Explanation

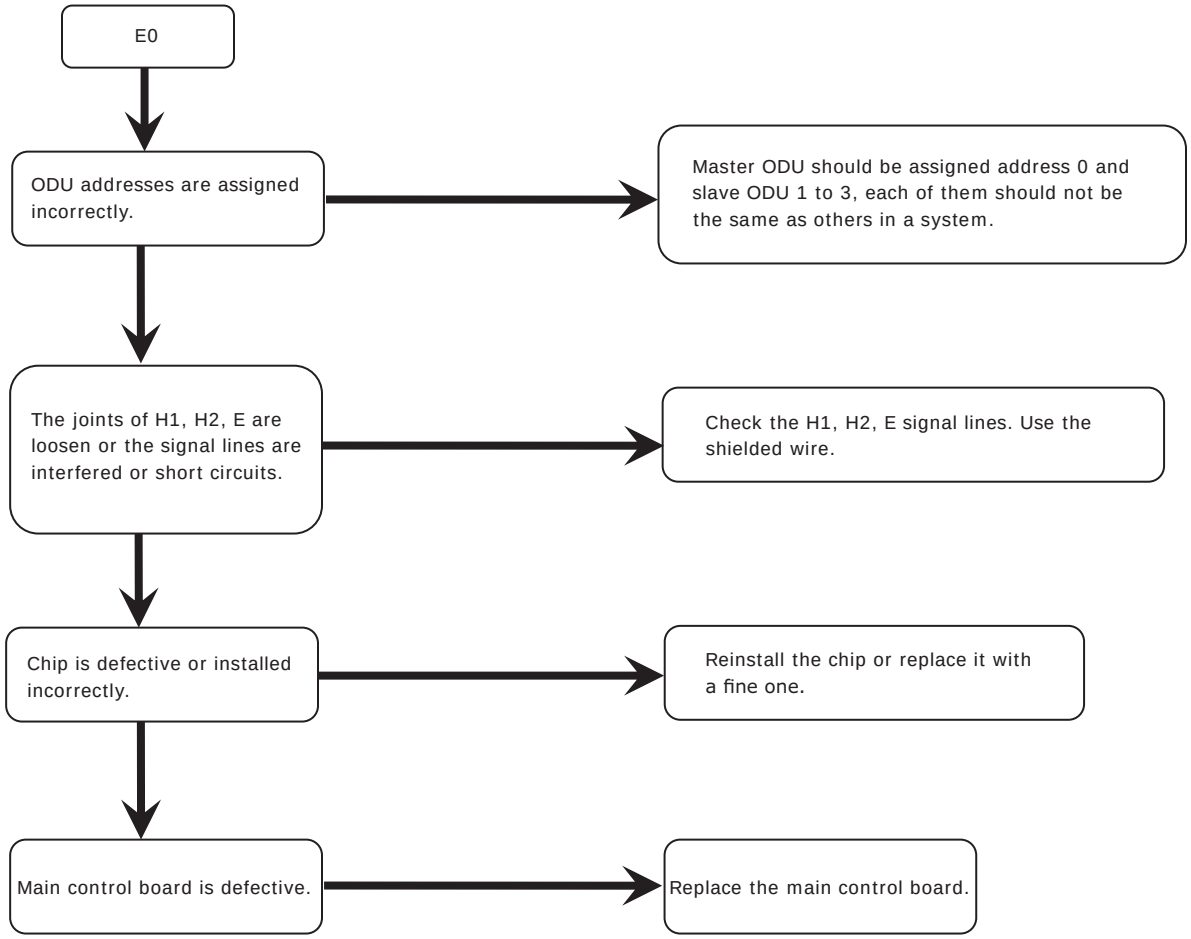
If some ODU compose a combination, we need to connect the H1, H2, E terminals of ODU correctly. Moreover we should switch master unit to address 0, slave 1 unit to 1, slave 2 unit to 2, slave 3 unit to 3. Address 4 and the above are invalid.

Supposed Causes

- Something wrong with the signal lines.
- Master ODU is not on or fails.
- The control boards of slave ODU break down.

Troubleshooting

Figure 1


E0
ODU addresses are assigned incorrectly.
Master ODU should be assigned address 0 and slave ODU 1 to 3, each of them should not be the same as others in a system.
The joints of H1, H2, E are loosen or the signal lines are interfered or short circuits.
Check the H1, H2, E signal lines. Use the shielded wire.
Chip is defective or installed incorrectly.
Reinstall the chip or replace it with a fine one.
Main control board is defective.
Replace the main control board.

“E1”: Phase sequence malfunction

Outdoor Unit Display

E1

Error Explanation

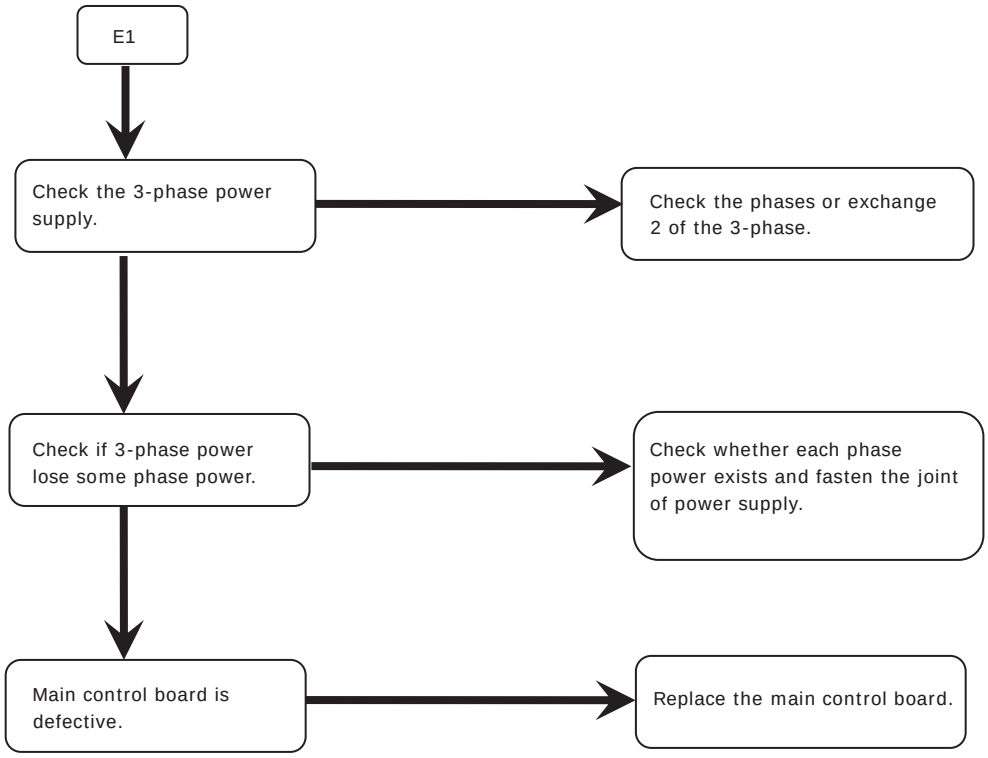
A, B, C terminal of three-phase power supply correspond with U, V, W of the compressor. The compressor could work normally only when they are perfectly matched.

Supposed Causes

- Phase sequence of the electricity supply does not match.
- In most circumstance, it is due to lack of power phase.

Troubleshooting

Figure 2


E1
Check the 3-phase power supply.
Check the phases or exchange 2 of the 3-phase.
Check if 3-phase power lose some phase power.
Check whether each phase power exists and fasten the joint of power supply.
Main control board is defective.
Replace the main control board.

“E2”: Communication failure between master ODU and IDU

Outdoor Unit Display

E2 (Master unit displays only)

Error Explanation

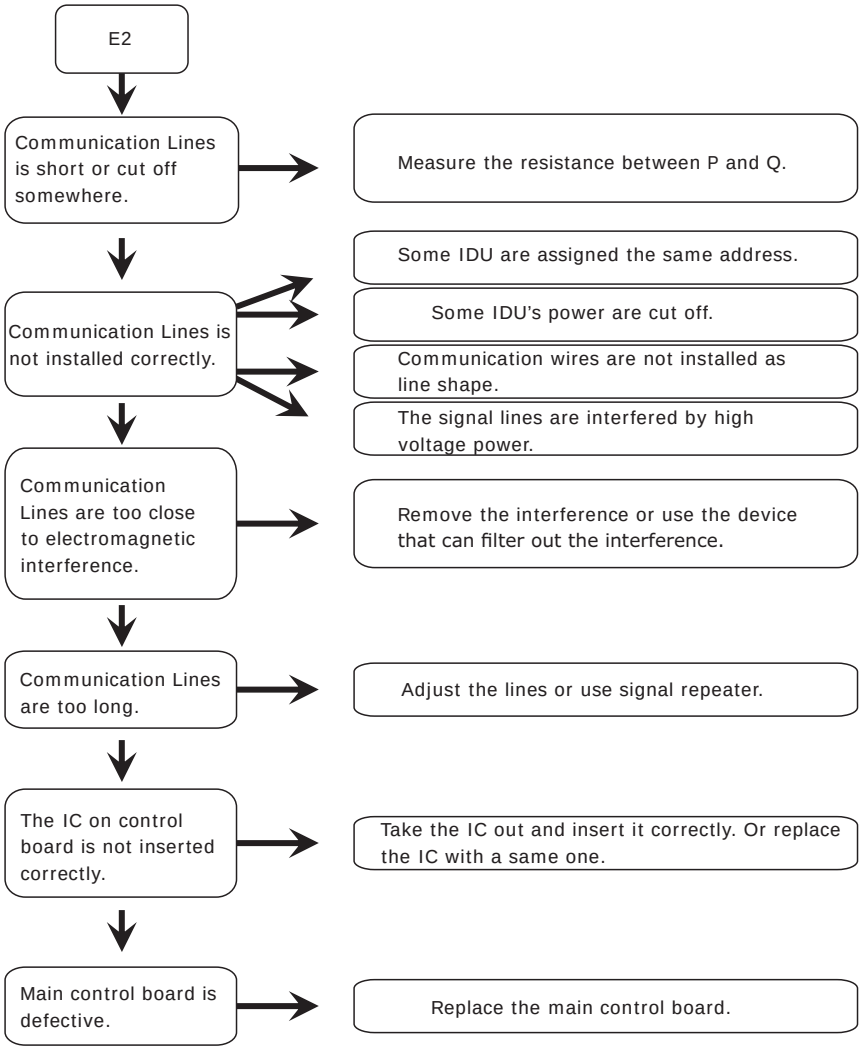
- Timer LED of indoor unit flashes quickly.
- The number of indoor unit that displayed on outdoor unit changes .
- Some of the indoor unit do not work, etc.

Supposed Causes

- IDU have the same address or the net address is set incorrectly.
- The signal lines do not work well.
- PQE bus is conducted somewhere.

Troubleshooting

Figure 3


E2
Communication Lines is short or cut off somewhere.
Measure the resistance between P and Q.
Communication Lines is not installed correctly.
Some IDU are assigned the same address.
Some IDU's power are cut off.
Communication wires are not installed as line shape.
The signal lines are interfered by high voltage power.
Communication Lines are too close to electromagnetic interference.
Remove the interference or use the device that can filter out the interference.
Communication Lines are too long.
Adjust the lines or use signal repeater.
The IC on control board is not inserted correctly.
Take the IC out and insert it correctly. Or replace the IC with a same one.
Main control board is defective.
Replace the main control board.

Remarks:

- Press indoor unit's receiver button for 5 seconds, the indoor unit's communication address code is displayed; press it for 10 seconds, power code is displayed. Check every unit's address code. Codes are as follows:

Table 2

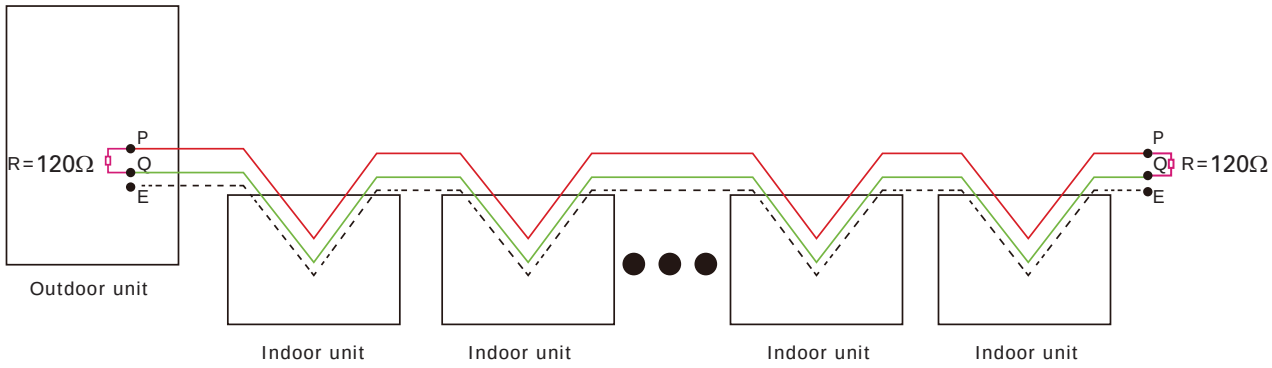
Director light	Running	Timer	Fan / defend cold fan	Warning
Code	8	4	2	1

Table 3

Address	0	1	2	3	4	5	6	7	8	9
Capacity (×100W)	22	28	36	45	56	71	80	90	112	140
HP	0.8	1.0	1.2	1.6	2.0	2.5	3.0	3.2	4.0	5.0
MBH	7.5	9	12	15	18	24	27	30	38	48

- If the signal is weak, a 120Ω resistor should be installed at the end of P and Q line of indoor units, and another 120Ω resistor should be installed at the end of P and Q of outdoor units. Please refer to the following picture for the installation:

Figure 4



“E4”: Ambient temp. sensor malfunction

Outdoor Unit Display

E4

Error Explanation

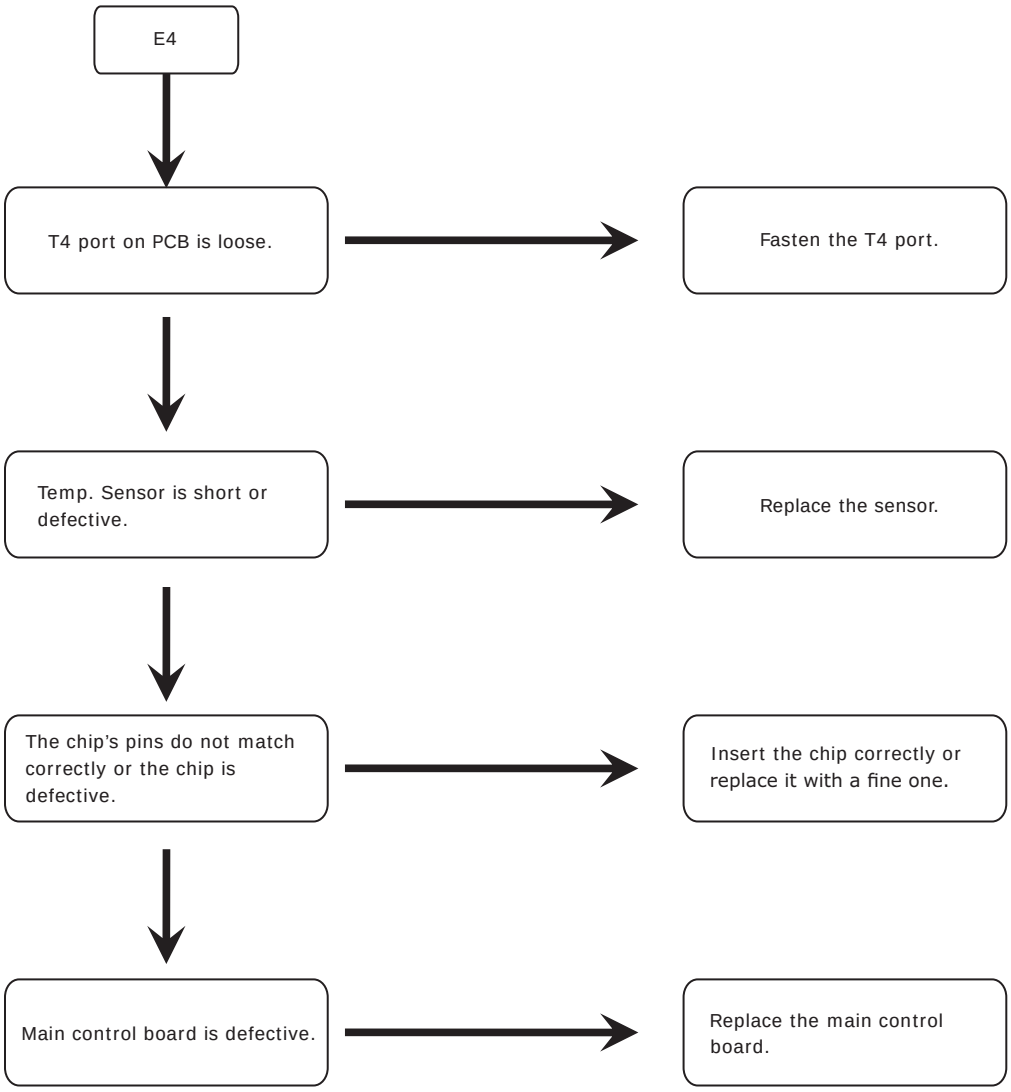
ODU displays E4.

Supposed Causes

- The sensor terminal is loose.
- The sensor circuit is short or open.
- The main control board’s clamp diodes are short or open.

Troubleshooting

Figure 5


E4
T4 port on PCB is loose.
Fasten the T4 port.
Temp. Sensor is short or defective.
Replace the sensor.
The chip’s pins do not match correctly or the chip is defective.
Insert the chip correctly or replace it with a fine one.
Main control board is defective.
Replace the main control board.

“E8”: Outdoor unit address is wrong

Outdoor Unit Display

E8

Error Explanation

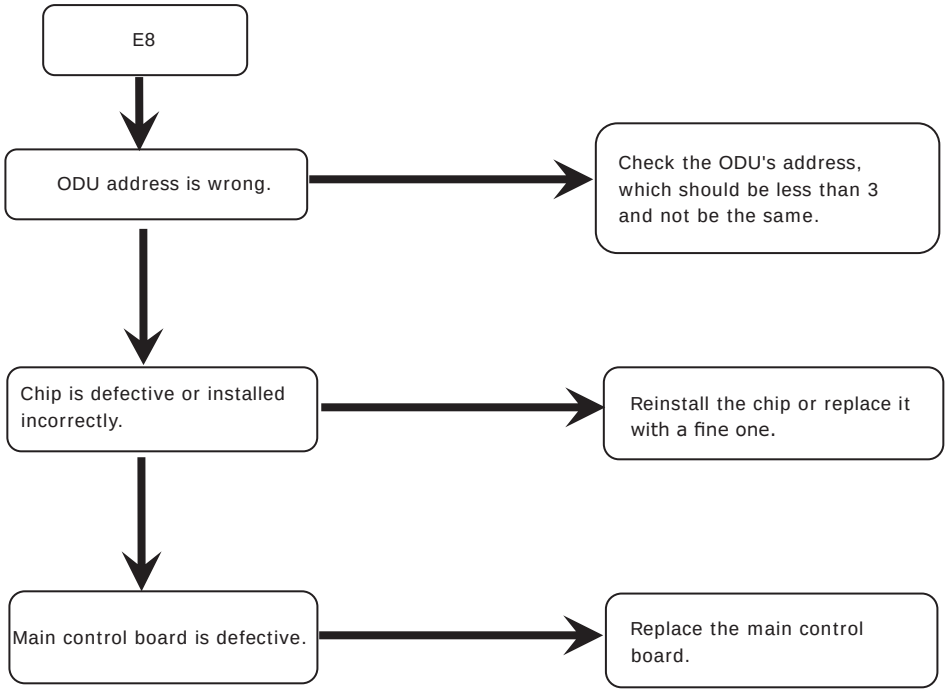
ODU displays E8.

Supposed Causes

ODU is assigned a wrong address..

Troubleshooting

Figure 6


E8
ODU address is wrong.
Check the ODU's address, which should be less than 3 and not be the same.
Chip is defective or installed incorrectly.
Reinstall the chip or replace it with a fine one.
Main control board is defective.
Replace the main control board.

“E9”: Voltage malfunction

Outdoor Unit Display

E9

Error Explanation

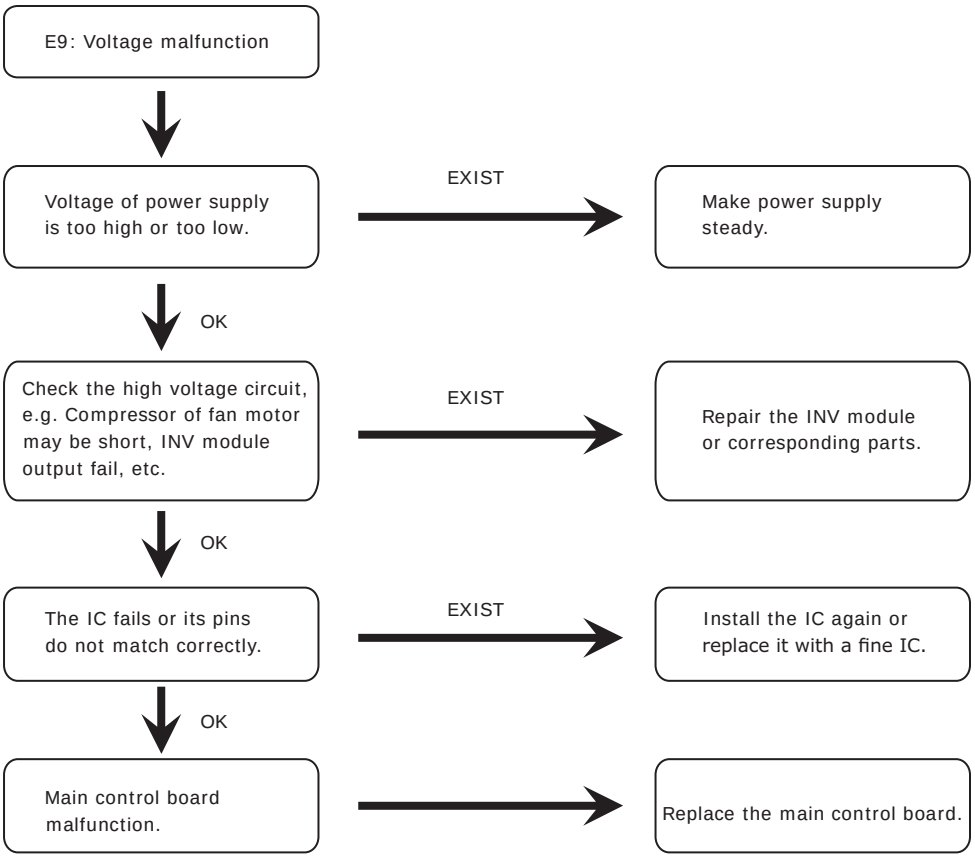
ODU displays E9. All the ODU standby.

Supposed Causes

- The voltage of power supply is too high or too low.
- The voltage of power supply fluctuates.
- The IC is loose or main board fails.

Troubleshooting

Figure 7


E9: Voltage malfunction
Voltage of power supply is too high or too low.
EXIST
Make power supply steady.
OK
Check the high voltage circuit, e.g. Compressor of fan motor may be short, INV module output fail, etc.
EXIST
Repair the INV module or corresponding parts.
OK
The IC fails or its pins do not match correctly.
EXIST
Install the IC again or replace it with a fine IC.
OK
Main control board malfunction.
Replace the main control board.

“H0”: Communication malfunction between DSP and 780034

Outdoor Unit Display

H0

Error Explanation

DSP IC is used for providing running parameter to compressor. IC780034 send the system’s parameter such as T3, T4, ODU power need, exhaust temp. etc. From which DSP IC calculates the compressor’s frequency.

Supposed Causes

- The power supply of DSP IC fails to work normally.
- Defect of either the DSP or the 780034.
- Disconnection of the IC 780034 pins.
- Defect of main control board.
- Environmental interference.

Troubleshooting

Normally the only way to deal with is to replace the main control board.

H1: Communication malfunction between IC 0537 and IC 780034

Outdoor Unit Display

H1

Error Explanation

For TVR™ II series, error happens between IC 0537 and IC 780034.

Supposed Causes

- IC 9177 or IC 0537 or IC 780034 is defective.
- Disconnection of the pins of IC 780034.
- Environment interference.

Troubleshooting

Normally the only way to deal with is to replace the main control board.

“H2”: Outdoor unit quantities decreasing malfunction

Outdoor Unit Display

H2 (Master unit displays only)

Error Explanation

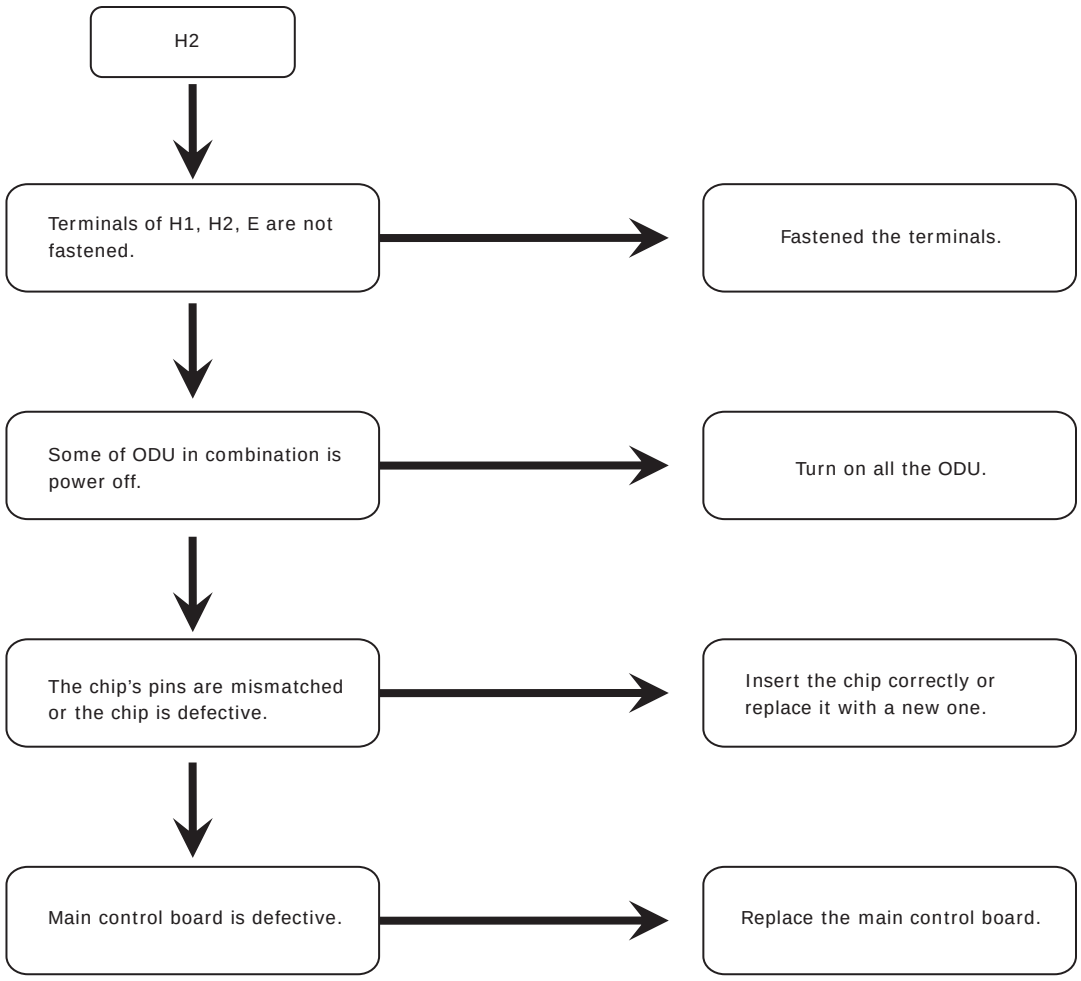
ODU displays H2. All ODU are standby.

Supposed Causes

- ODU communication lines loose.
- Some of the ODU in combination power off.

Troubleshooting

Figure 8


H2
Terminals of H1, H2, E are not fastened.
Fastened the terminals.
Some of ODU in combination is power off.
Turn on all the ODU.
The chip's pins are mismatched or the chip is defective.
Insert the chip correctly or replace it with a new one.
Main control board is defective.
Replace the main control board.

“H7”: Outdoor unit quantities decreasing malfunction

Outdoor Unit Display

H7

Error Explanation

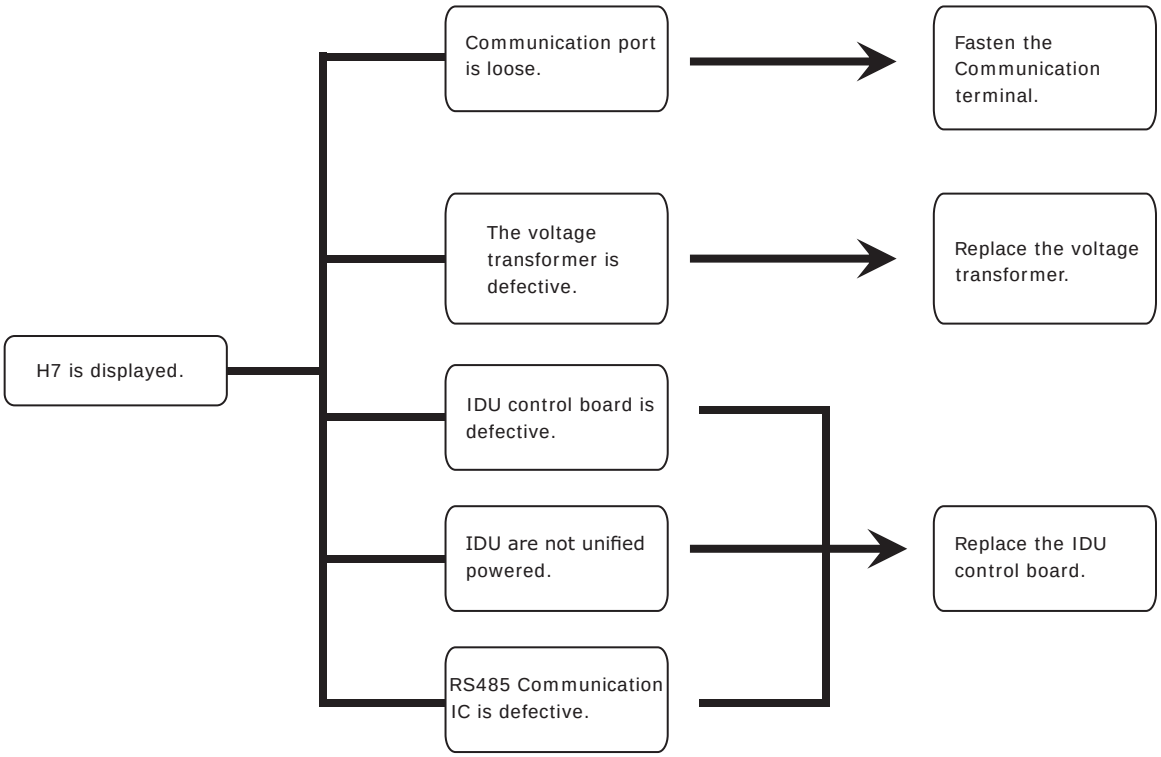
ODU displays H7. All the ODU standby.

Supposed Causes

- The communication terminal of IDU is loose.
- The voltage transformer of IDU is defective.
- IDU installation is not standard nor unified powered.
- The control board of IDU is defective.

Troubleshooting

Figure 9


H7 is displayed.
Communication port is loose.
Fasten the Communication terminal.
The voltage transformer is defective.
Replace the voltage transformer.
IDU control board is defective.
IDU are not unified powered.
Replace the IDU control board.
RS485 Communication IC is defective.

“P0”: The sensor protection on the top of inv. Compressor

Outdoor Unit Display

P0

Error Explanation

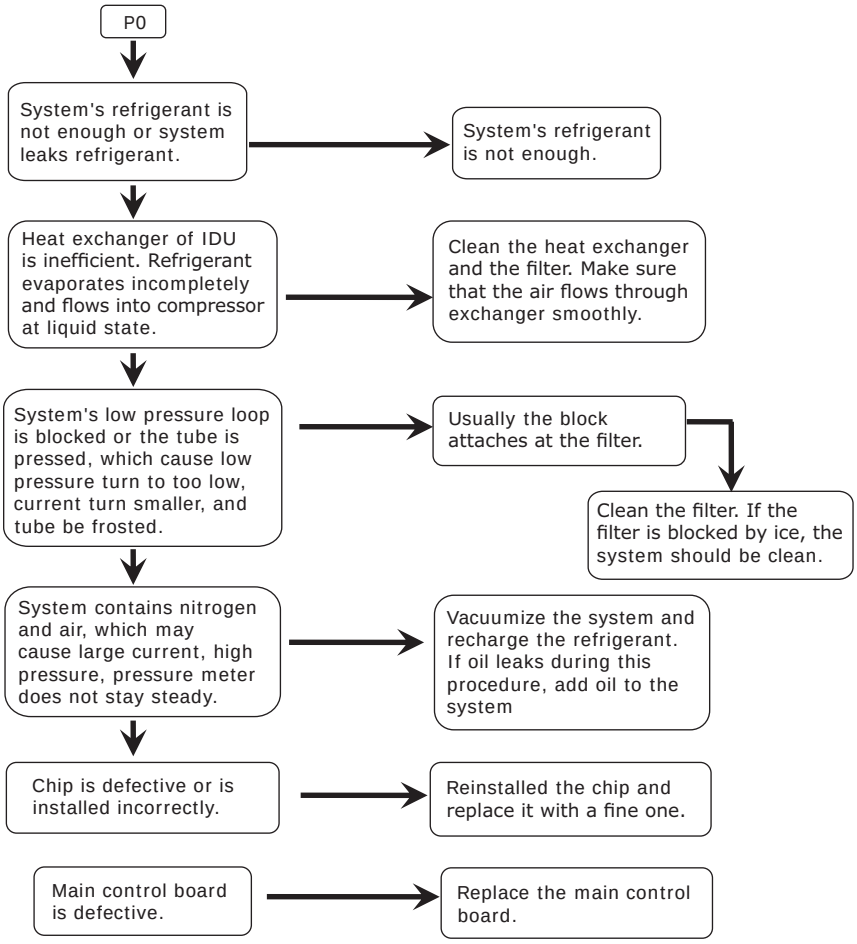
One ODU displays P0 and changes to protecting standby state.

Supposed Causes

- Refrigerant is not enough.
- Efficiency of outdoor heat exchange is low.
- Refrigerant does not loop smoothly.
- Control board is defective.

Troubleshooting

Figure 10


P0
System's refrigerant is not enough or system leaks refrigerant.
System's refrigerant is not enough.
Heat exchanger of IDU is inefficient. Refrigerant evaporates incompletely and flows into compressor at liquid state.
Clean the heat exchanger and the filter. Make sure that the air flows through exchanger smoothly.
System's low pressure loop is blocked or the tube is pressed, which cause low pressure turn to too low, current turn smaller, and tube be frosted.
Usually the block attaches at the filter.
Clean the filter. If the filter is blocked by ice, the system should be clean.
System contains nitrogen and air, which may cause large current, high pressure, pressure meter does not stay steady.
Vacuumize the system and recharge the refrigerant. If oil leaks during this procedure, add oil to the system
Chip is defective or is installed incorrectly.
Reinstalled the chip and replace it with a fine one.
Main control board is defective.
Replace the main control board.

Remarks:

When system appear 3 times P0 or P4 protection in 100 minutes, system will auto shut down and display H6 malfunction, which can recover only by restarting the machine. At this time, malfunction should be promptly resolved to avoid further damage.

“P1”: High pressure protection

Outdoor Unit Display

P1

Error Explanation

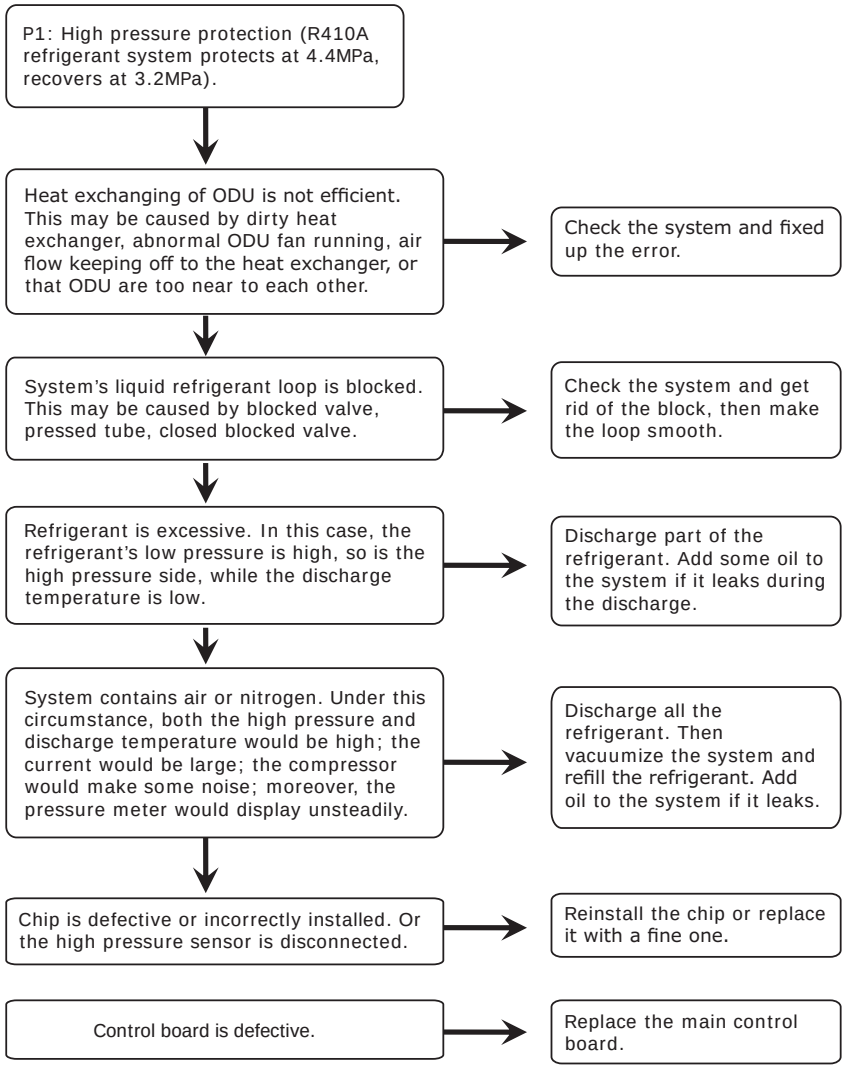
One ODU displays P1 and changes to protecting standby state.

Supposed Causes

- Refrigerant is excessive.
- Refrigerant does not loop smoothly.
- The refrigerant loop contains air.
- Control board is defective.

Troubleshooting

Figure 11


P1: High pressure protection (R410A refrigerant system protects at 4.4MPa, recovers at 3.2MPa).
Heat exchanging of ODU is not efficient. This may be caused by dirty heat exchanger, abnormal ODU fan running, air flow keeping off to the heat exchanger, or that ODU are too near to each other.
Check the system and fixed up the error.
System’s liquid refrigerant loop is blocked. This may be caused by blocked valve, pressed tube, closed blocked valve.
Check the system and get rid of the block, then make the loop smooth.
Refrigerant is excessive. In this case, the refrigerant’s low pressure is high, so is the high pressure side, while the discharge temperature is low.
Discharge part of the refrigerant. Add some oil to the system if it leaks during the discharge.
System contains air or nitrogen. Under this circumstance, both the high pressure and discharge temperature would be high; the current would be large; the compressor would make some noise; moreover, the pressure meter would display unsteadily.
Discharge all the refrigerant. Then vacuumize the system and refill the refrigerant. Add oil to the system if it leaks.
Chip is defective or incorrectly installed. Or the high pressure sensor is disconnected.
Reinstall the chip or replace it with a fine one.
Control board is defective.
Replace the main control board.

“P2”: Low pressure protection

Outdoor Unit Display

P2

Error Explanation

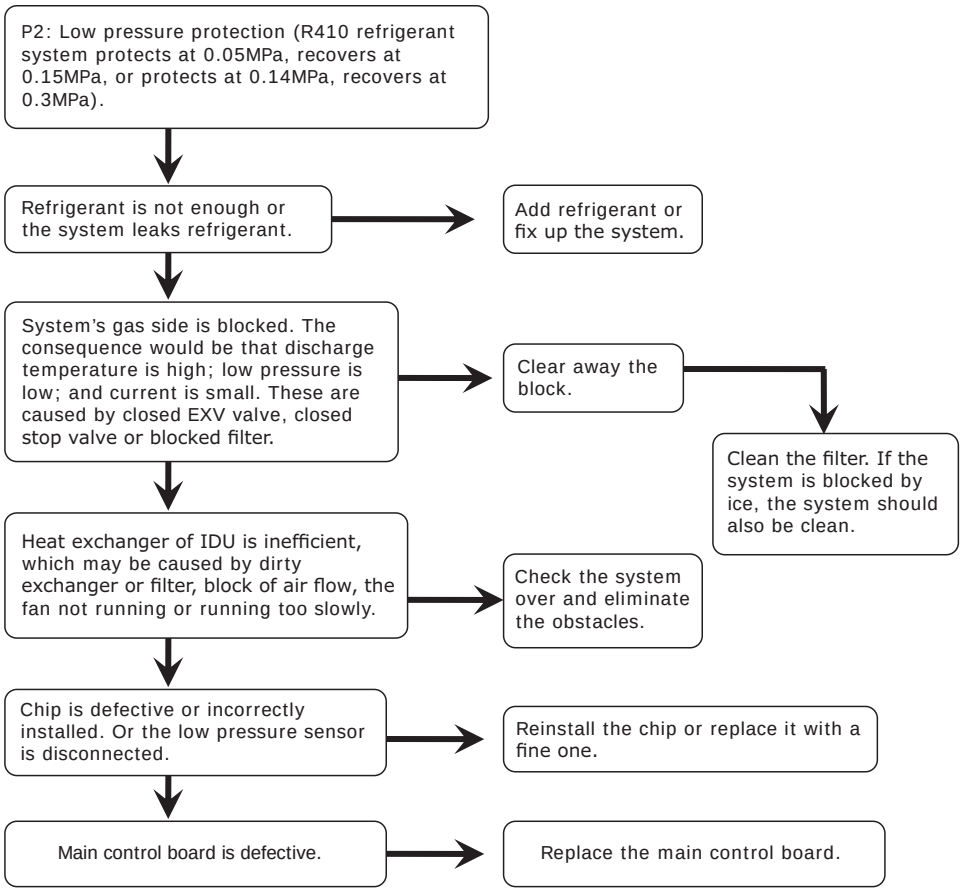
One ODU displays P2 and changes to protecting standby state.

Supposed Causes

- Refrigerant is not enough.
- Refrigerant does not loop smoothly.
- Efficiency of indoor heat exchange is low.
- Control board is not defective.

Troubleshooting

Figure 12


P2: Low pressure protection (R410 refrigerant system protects at 0.05MPa, recovers at 0.15MPa, or protects at 0.14MPa, recovers at 0.3MPa).
Refrigerant is not enough or the system leaks refrigerant.
Add refrigerant or fix up the system.
System’s gas side is blocked. The consequence would be that discharge temperature is high; low pressure is low; and current is small. These are caused by closed EXV valve, closed stop valve or blocked filter.
Clear away the block.
Clean the filter. If the system is blocked by ice, the system should also be clean.
Heat exchanger of IDU is inefficient, which may be caused by dirty exchanger or filter, block of air flow, the fan not running or running too slowly.
Check the system over and eliminate the obstacles.
Chip is defective or incorrectly installed. Or the low pressure sensor is disconnected.
Reinstall the chip or replace it with a fine one.
Main control board is defective.
Replace the main control board.

Remarks:

When system appear 3 times P2 protection in 30 minutes, system will auto shut down and display H5 malfunction, which can recover only by restarting the machine. Malfunction should be promptly resolved to avoid further damage.

“P3”: Inv. compressor over current protection

Outdoor Unit Display

P3

Error Explanation

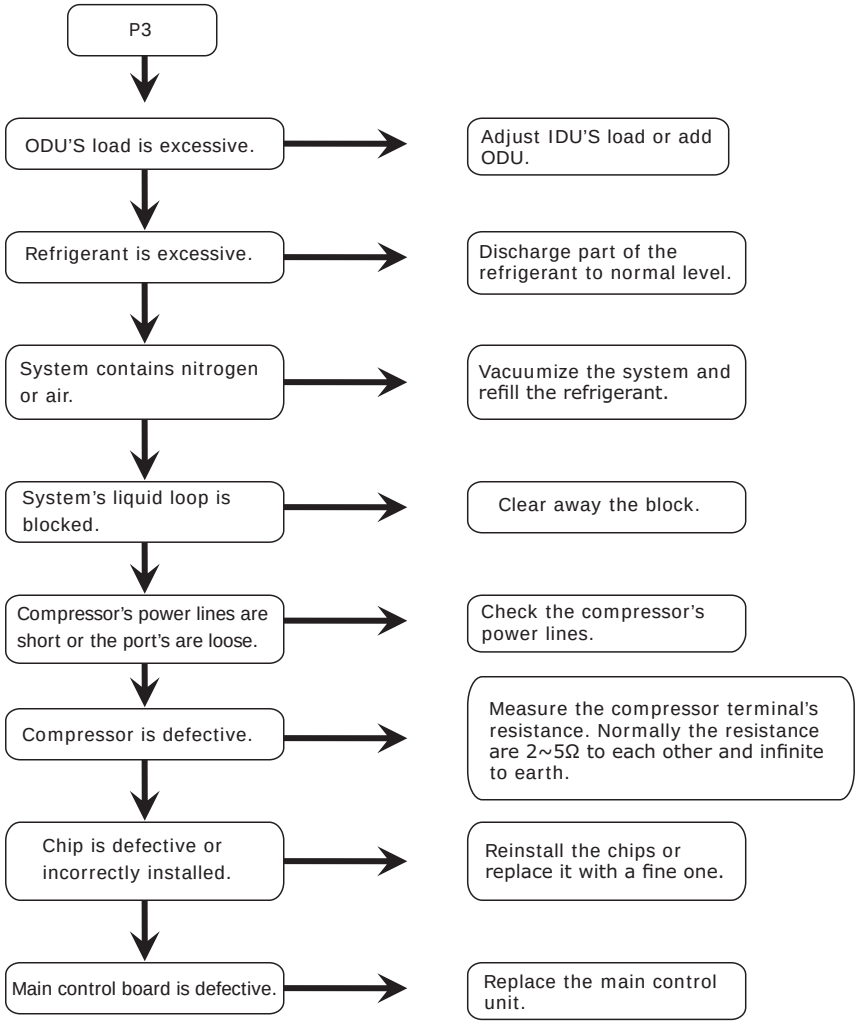
ODU displays P3.

Supposed Causes

- Load on ODU is excessive.
- Outdoor heat exchanging is not efficient.
- Refrigerant is excessive.
- Compressor or its circuit is defective.
- Control board is defective.

Troubleshooting

Figure 13


P3
ODU'S load is excessive.
Adjust IDU'S load or add ODU.
Refrigerant is excessive.
Discharge part of the refrigerant to normal level.
System contains nitrogen or air.
Vacuumize the system and refill the refrigerant.
System's liquid loop is blocked.
Clear away the block.
Compressor's power lines are short or the port's are loose.
Check the compressor's power lines.
Compressor is defective.
Measure the compressor terminal's resistance. Normally the resistance are 2~5Ω to each other and infinite to earth.
Chip is defective or incorrectly installed.
Reinstall the chips or replace it with a fine one.
Main control board is defective.
Replace the main control unit.

“P4”: Discharge temp. sensor protection

Outdoor Unit Display

P4

Error Explanation

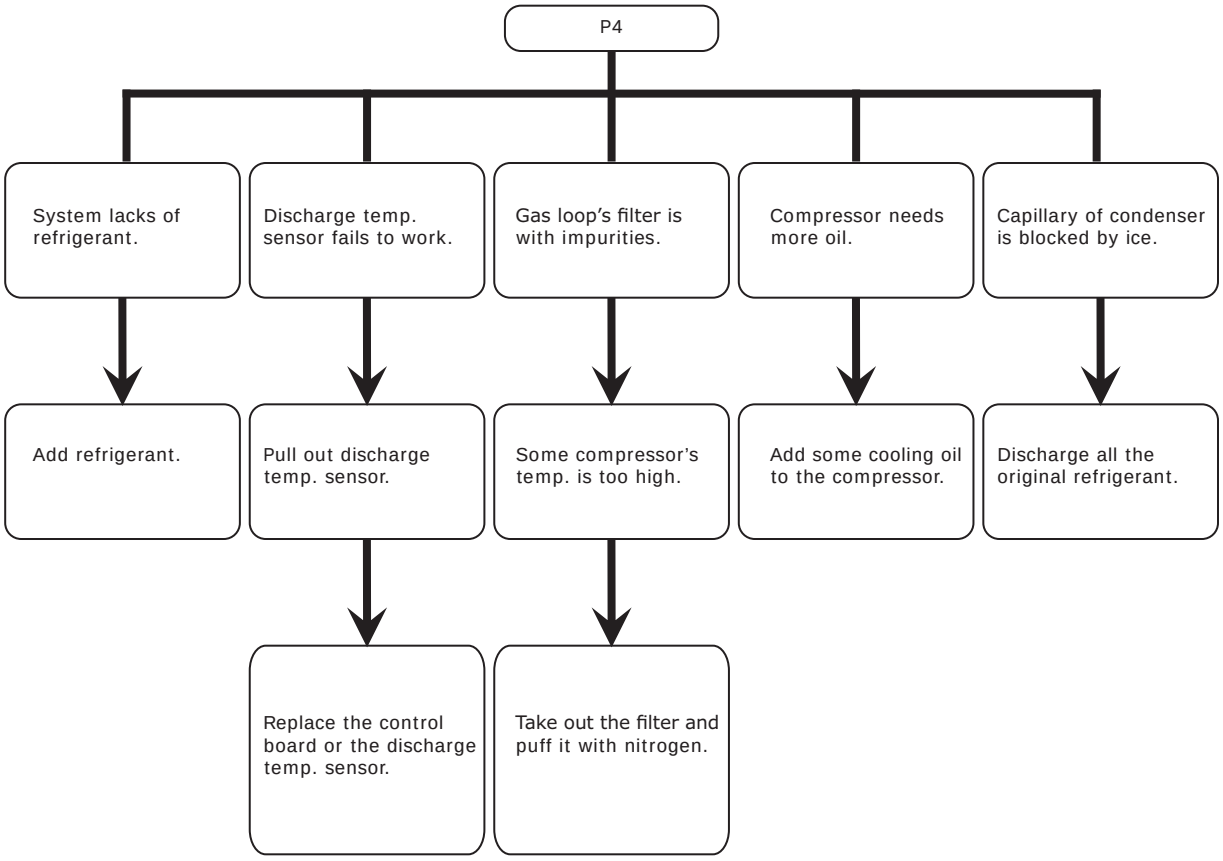
One ODU displays P4 and changes to protecting standby state.

Supposed Causes

- Refrigerant is not enough.
- Refrigerant does not loop smoothly.
- Compressor needs more oil.
- Control board is defective.

Troubleshooting

Figure 14


P4
System lacks of refrigerant.
Discharge temp. sensor fails to work.
Gas loop’s filter is with impurities.
Compressor needs more oil.
Capillary of condenser is blocked by ice.
Add refrigerant.
Pull out discharge temp. sensor.
Some compressor’s temp. is too high.
Add some cooling oil to the compressor.
Discharge all the original refrigerant.
Replace the control board or the discharge temp. sensor.
Take out the filter and puff it with nitrogen.

“P5”: Pipe temp. sensor protection

Outdoor Unit Display

P5

Error Explanation

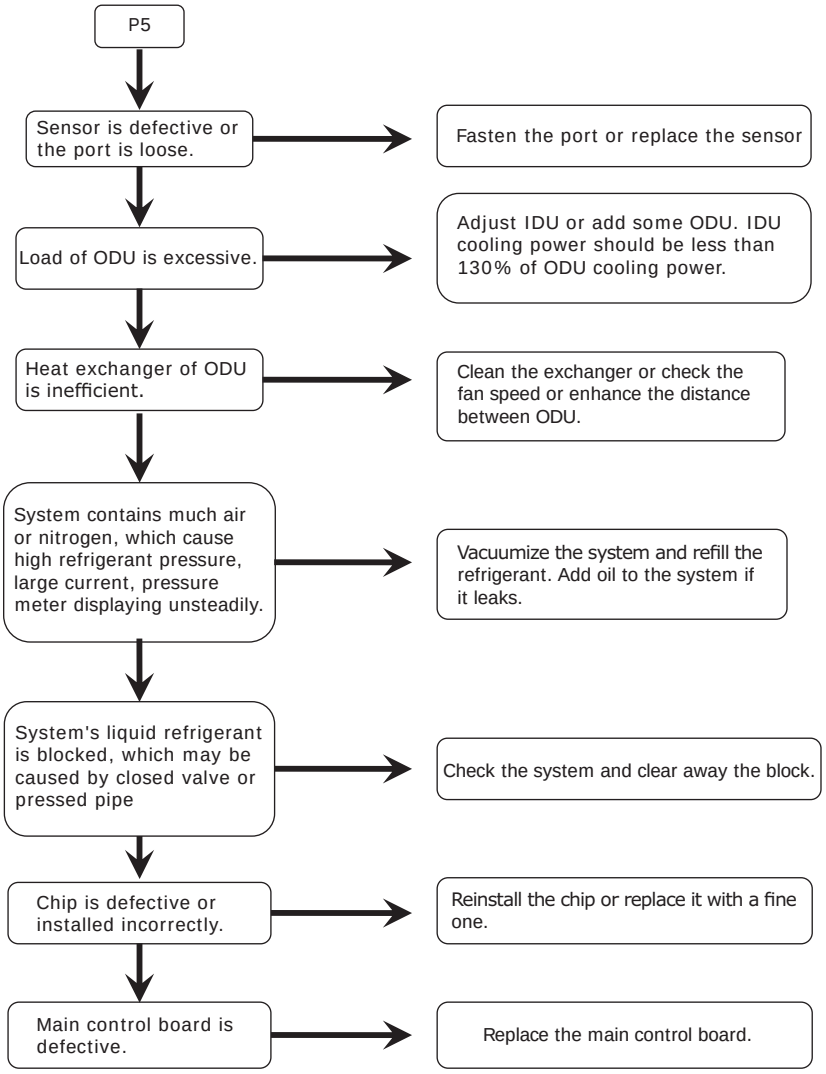
One ODU displays P4 and changes to protecting standby state.

Supposed Causes

- System’s load is excessive.
- Heat exchanging is not efficient.
- Liquid refrigerant is blocked.
- Refrigerant is mixed with impurities.

Troubleshooting

Figure 15


P5
Sensor is defective or the port is loose.
Fasten the port or replace the sensor
Load of ODU is excessive.
Adjust IDU or add some ODU. IDU cooling power should be less than 130% of ODU cooling power.
Heat exchanger of ODU is inefficient.
Clean the exchanger or check the fan speed or enhance the distance between ODU.
System contains much air or nitrogen, which cause high refrigerant pressure, large current, pressure meter displaying unsteadily.
Vacuumize the system and refill the refrigerant. Add oil to the system if it leaks.
System's liquid refrigerant is blocked, which may be caused by closed valve or pressed pipe
Check the system and clear away the block.
Chip is defective or installed incorrectly.
Reinstall the chip or replace it with a fine one.
Main control board is defective.
Replace the main control board.

“P6”: Module protection

Outdoor Unit Display

P6

Error Explanation

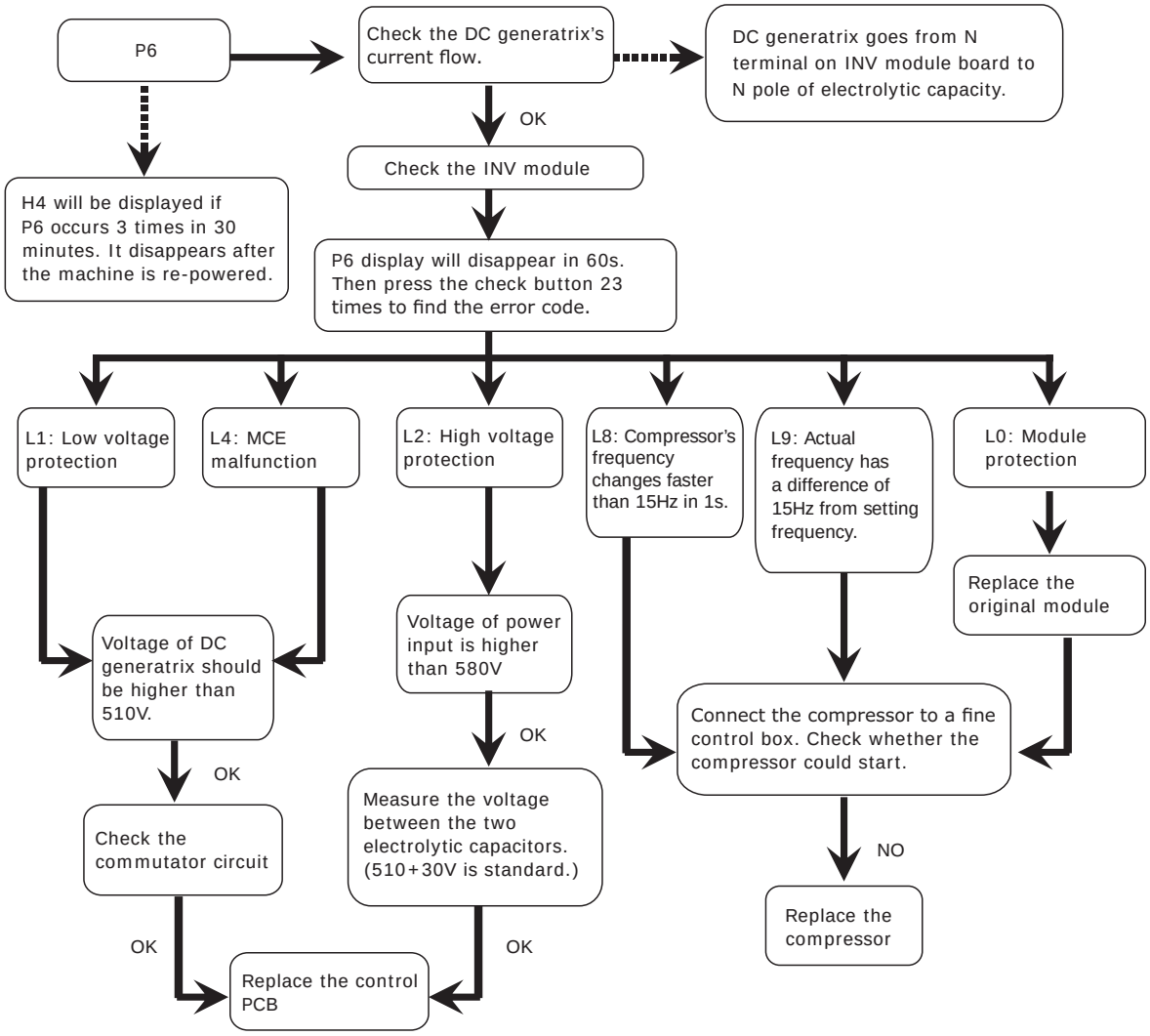
ODU displays P6.

Supposed Causes

- DC generatrix is not lined correctly.
- DC generatrix low or high voltage protection.
- MCE malfunction.
- Compressor’s frequency changes incorrectly.

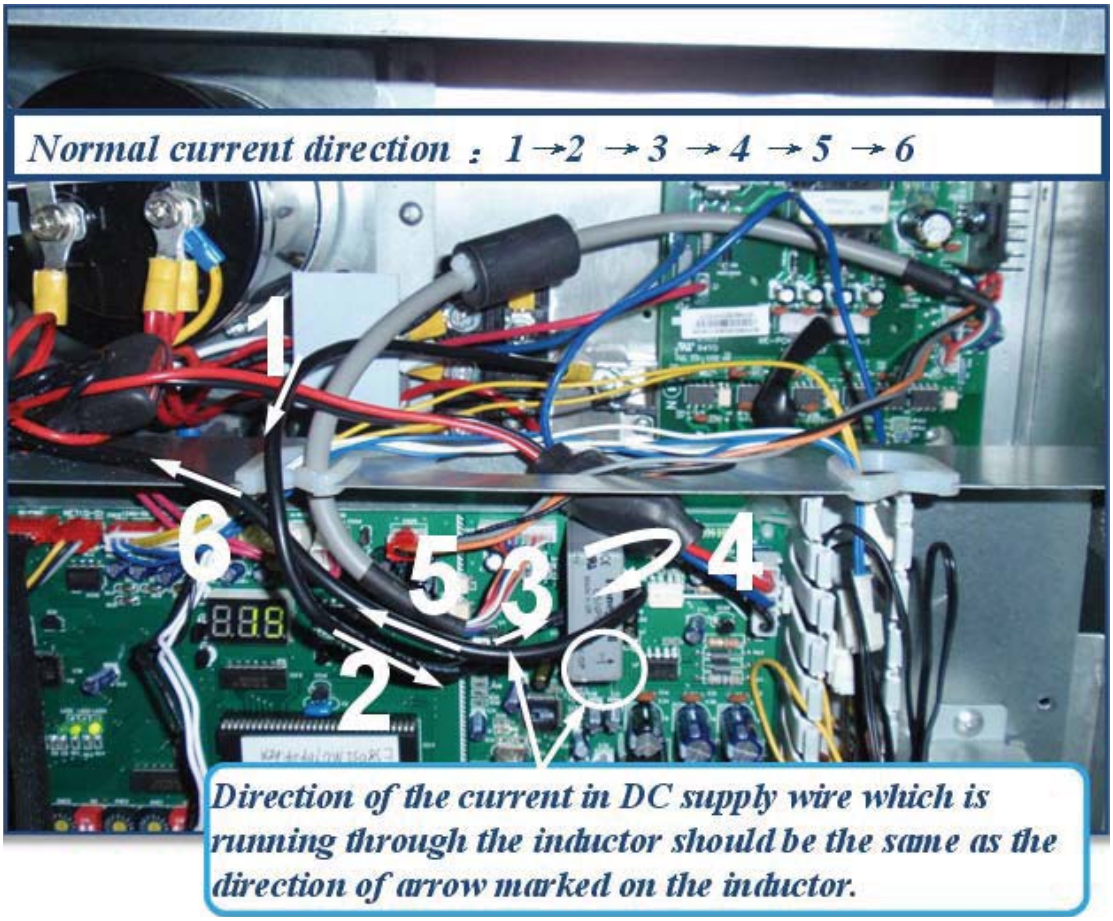
Troubleshooting

Figure 16


P6
Check the DC generatrix's current flow.
DC generatrix goes from N terminal on INV module board to N pole of electrolytic capacity.
OK
Check the INV module
H4 will be displayed if P6 occurs 3 times in 30 minutes. It disappears after the machine is re-powered.
P6 display will disappear in 60s. Then press the check button 23 times to find the error code.
L1: Low voltage protection
L4: MCE malfunction
L2: High voltage protection
L8: Compressor's frequency changes faster than 15Hz in 1s.
L9: Actual frequency has a difference of 15Hz from setting frequency.
L0: Module protection
Replace the original module
Voltage of DC generatrix should be higher than 510V.
Voltage of power input is higher than 580V
OK
OK
Connect the compressor to a fine control box. Check whether the compressor could start.
Check the commutator circuit
Measure the voltage between the two electrolytic capacitors. (510+30V is standard.)
NO
Replace the compressor
OK
OK
Replace the control PCB

DC generatrix detection

Figure17

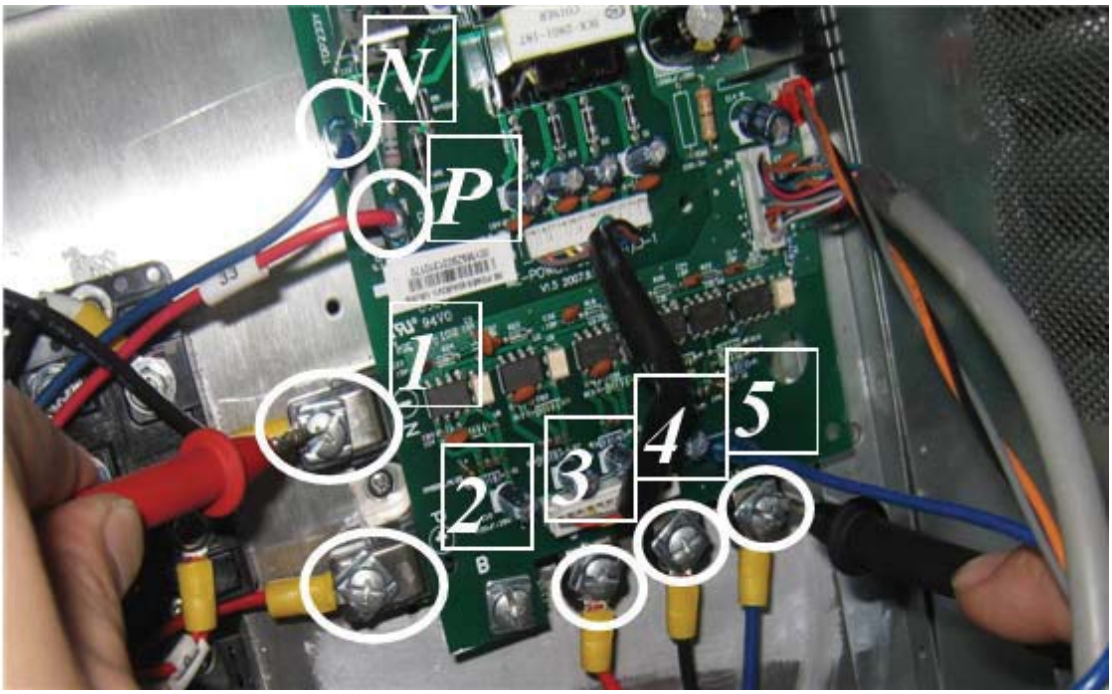

Normal current direction : 1→2 →3 →4 →5 →6
1
6
5
3
4
2
Direction of the current in DC supply wire which is running through the inductor should be the same as the direction of arrow marked on the inductor.

Voltage check of DC generatrix

- Check the voltage of DC generatrix, which is normal between 510V and 580V. If not, go ahead with the next step.
- Check the rectification circuit. Find out any loose point in the circuit. Moreover, check the filter board, and rectifier stacks. Be noted with DC and AC switch on the meter while doing this.
- If none of the above works, replace the main control board.

Voltage check of module

Figure 18



- The voltage between N and P should be 1.41 times to local power supply.
- The voltage between 1 and 2 should range from 510V to 580V.
- The resistance between 1, 2, 3, 4, 5 should be infinite. If any of them is about 0, indicating that the module has already been broken down, then we should replace the module.

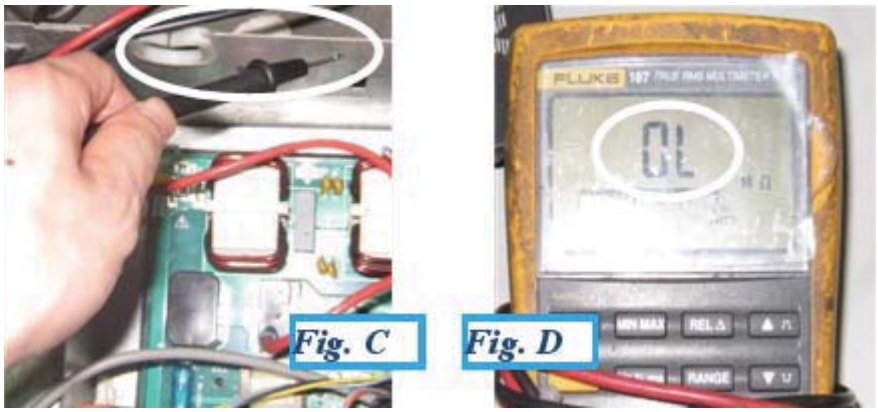
Compressor's characteristics

- Measure the resistance among the compressor's U, V, W respectively. The resistance should range from 0.9 to 5 use symbol and be the same.

Figure 19

- Measure the resistance between the compressor's U, V, W and GND respectively. The resistance should be more or less mega-Ohms.

Figure 20



- Measure the current of the compressor's U, V, W terminal respectively, which should be more or less the same, by e.g. current flow table clamp. They should be 4A at the frequency of 35 Hz.

P6 appears after the compressor turns on with difficulties

- Check the module according to step 3 first.
- If the module works, make the machine standby for 4 hours with power supply, which can help heat the refrigerant and oil adequately.
- Start the fixed frequency compressor only for 3s to 5s.The great startup pressure could wash the impurity away in the tube.
- If the compressor's frequency climb to 37 Hz of above in 2s after turning on, then there's something wrong with the compressor, which should be conducted with careful check.
- If the compressor's current is normal, then the malfunction lies with the control board. In this case, please replace the control board.

The machine is powered on and P6 appears at once

Figure 21

In normal situation:

LED 1: Flash in 1Hz (slowly flash) when standby

LED 1: On when running

LED 2: Off

Phenomenon A

LED 2 red ON

LED 1 flash green for 8 times and then stop for 1s repeatedly

Error: Inverter module failure

Phenomenon B

LED 2 red ON

LED 1 flash green for 9 times and then stop for 1s repeatedly

Error: Low voltage protection

Here are 3 circumstances:

- The voltage between the two electrolytic capacitors is less than 450V. The AC contactor should be picked up. If not, there's something wrong with the main control board or the PTC resistors, which need to be replaced correspondingly.
- Somewhere is loose in the circuit.
- The voltage between P and N of CN12 on the main control board should range from 450V to 570V. If the voltage between N terminal and the middle terminal of CN12 is 15V, this indicates that the main control board fails, which needs to be replaced.

Phenomenon C

LED 2 red ON

LED1 flash green for 10 times and then stop for 1s repeatedly.

Error: High voltage protection

Here are 2 circumstance:

Three-phase power supply's voltage is more than 440V

Main control board fails. Please replace it.

“P7”: Fixed 1 current protection

Outdoor Unit Display

P7

Error Explanation

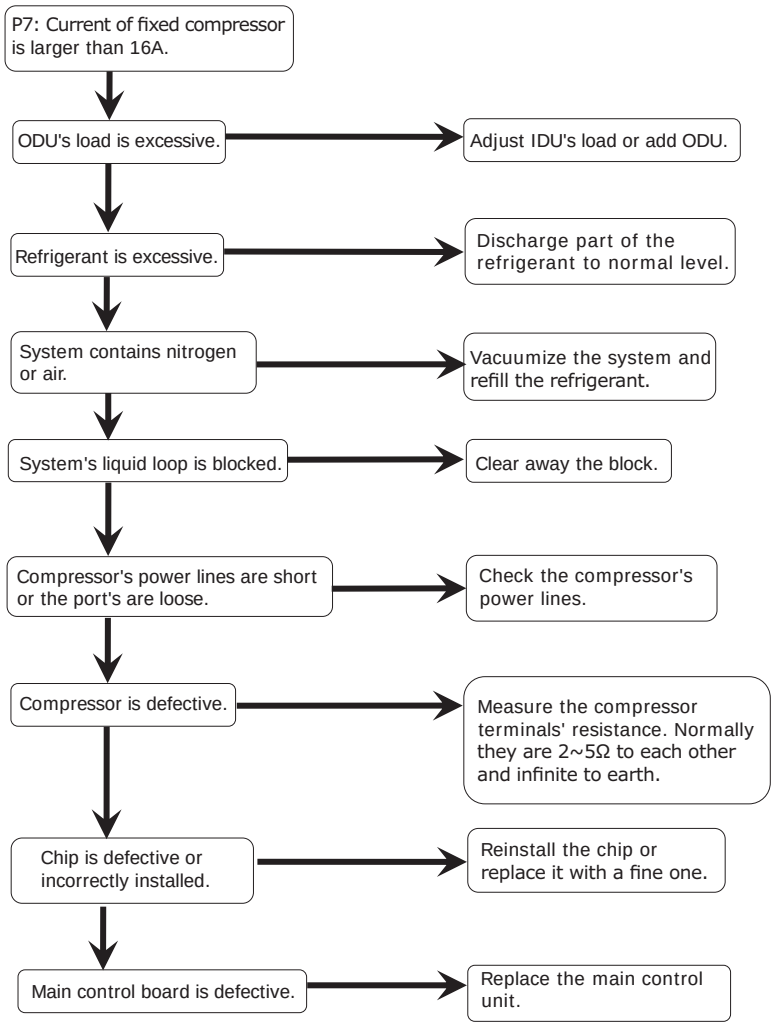
ODU displays P7.

Supposed Causes

- Load on ODU is excessive.
- Outdoor heat exchanging is not efficient.
- Refrigerant is excessive.
- Compressor or its circuit is defective.
- Control board is defective.

Troubleshooting

Figure 22


P7: Current of fixed compressor is larger than 16A.
ODU's load is excessive.
Adjust IDU's load or add ODU.
Refrigerant is excessive.
Discharge part of the refrigerant to normal level.
System contains nitrogen or air.
Vacuumize the system and refill the refrigerant.
System's liquid loop is blocked.
Clear away the block.
Compressor's power lines are short or the port's are loose.
Check the compressor's power lines.
Compressor is defective.
Measure the compressor terminals' resistance. Normally they are 2~5Ω to each other and infinite to earth.
Chip is defective or incorrectly installed.
Reinstall the chip or replace it with a fine one.
Main control board is defective.
Replace the main control unit.

“P8”: Fixed 2 current protection

Outdoor Unit Display

P8

Error Explanation

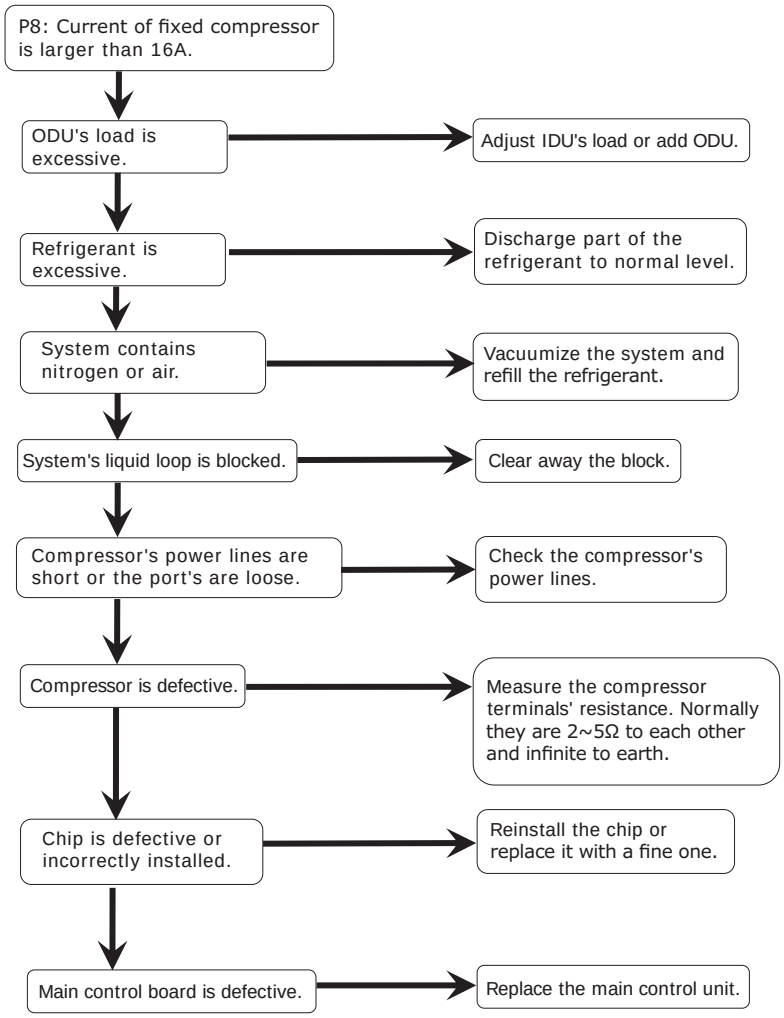
ODU displays P8.

Supposed Causes

- Load on ODU is excessive.
- Outdoor heat exchanging is not efficient.
- Refrigerant is excessive.
- Compressor or its circuit is defective.
- Control board is defective.

Troubleshooting

Figure 23


P8: Current of fixed compressor is larger than 16A.
ODU's load is excessive.
Adjust IDU's load or add ODU.
Refrigerant is excessive.
Discharge part of the refrigerant to normal level.
System contains nitrogen or air.
Vacuumize the system and refill the refrigerant.
System's liquid loop is blocked.
Clear away the block.
Compressor's power lines are short or the port's are loose.
Check the compressor's power lines.
Compressor is defective.
Measure the compressor terminals' resistance. Normally they are 2~5Ω to each other and infinite to earth.
Chip is defective or incorrectly installed.
Reinstall the chip or replace it with a fine one.
Main control board is defective.
Replace the main control unit.

“P9”: Fan module protection

Outdoor Unit Display

P9 (TVR™ II)

Error Explanation

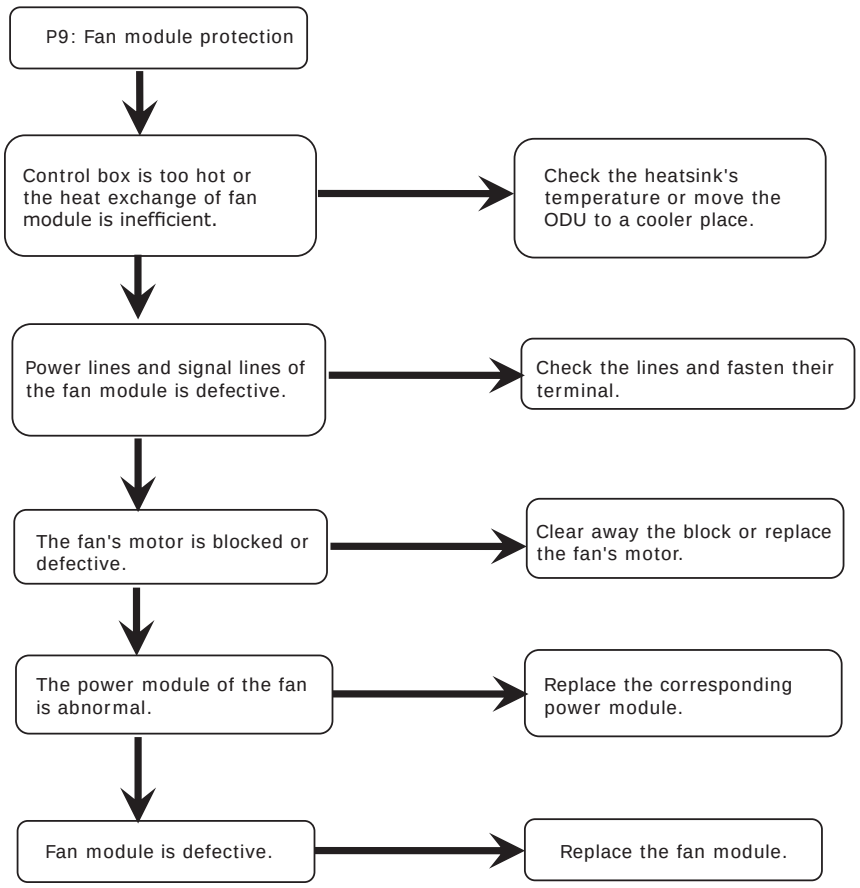
ODU displays P9, and only TVR™ II series system would display this code.

Supposed Causes

- Control box is too hot.
- Fan is blocked, defective or powered incorrectly.
- Signal line is loose.
- Fan module is defective.

Troubleshooting

Figure 24


P9: Fan module protection
Control box is too hot or the heat exchange of fan module is inefficient.
Check the heatsink's temperature or move the ODU to a cooler place.
Power lines and signal lines of the fan module is defective.
Check the lines and fasten their terminal.
The fan's motor is blocked or defective.
Clear away the block or replace the fan's motor.
The power module of the fan is abnormal.
Replace the corresponding power module.
Fan module is defective.
Replace the fan module.

Remarks:

If P9 occurs 3 times in 30 minutes, system will auto shut down and display H9 malfunction, which could be recovered only by restarting the machine. At this time, malfunction should be promptly resolved to avoid further damage.

Part 6 Electric and Control System

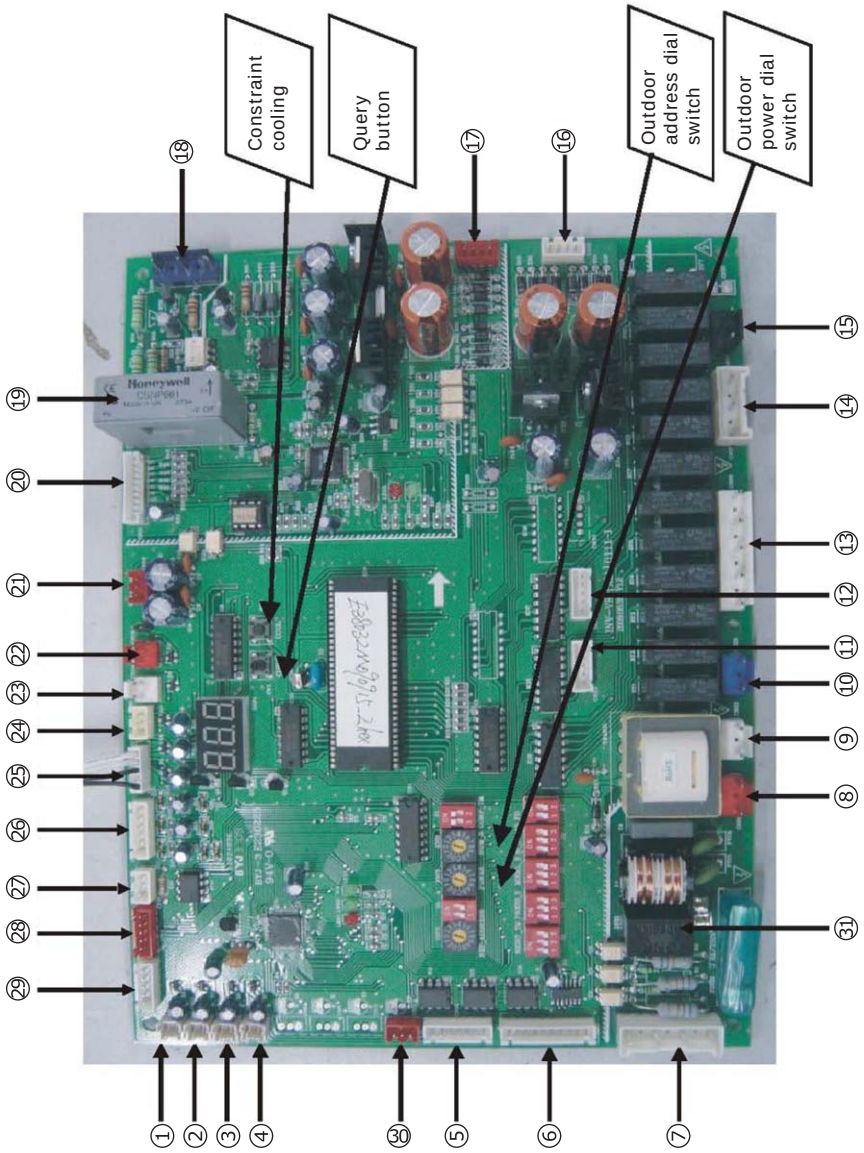
Electric System

Wiring Diagrams and Field Wiring

Wiring diagrams and field wiring please refer to the corresponding part in "Part 2 Specifications & Performance".

Description of Main Control Board of Outdoor unit

Figure 1



Dial codes definition

Table 1

S1 definition

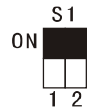
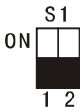
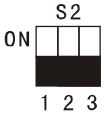
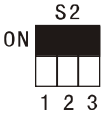
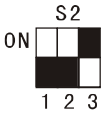
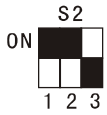
	
Starting time is set about 3 minutes	Starting time is set about 12 minutes (Default)

Table 2

S2 definition

			
Night time selection is 6h/10h (default)	Night time selection is 8h/10h	Night time selection is 6h/12h	Night time selection is 8h/8h

S3 definition is reserved

Table 3

S4 definition

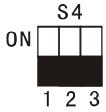
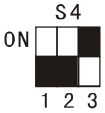
	
Static pressure mode is 0 MPa (default)	Static pressure mode is high pressure

Table 4

S5 definition

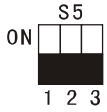
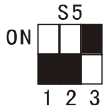
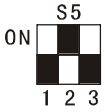
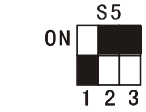
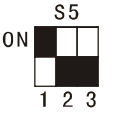
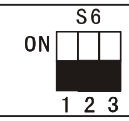
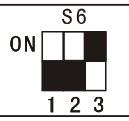
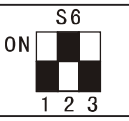
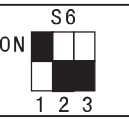
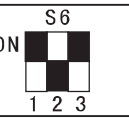
				
Heating priority (default)	Cooling priority	Starting time priority	Only respond to heating mode	Only respond to the cooling mode

Table 5

S6 definition——non-grouped keys

				
Night noise control mode and automatically assign address	Night noise control mode and manually assign address	Clear all the auto assigned address	Night noise control mode un-used and automatically assign address	Night noise control mode un-used and automatically assign address

S7 definition is reserved

ENC1: 0 indicates the master unit; 1-3 indicate slave unit.

ENC2: 0, 1, 2, 3, 4 individually correspond to 8HP, 10HP, 12HP, 14HP, 16HP

ENC3: network address setting code

Explanation of main board

Table 6

No.	Content	No.	Content
1	Reserved	17	Power output of the No.2 transformer
2	Air discharge temp. sensed port at the No.2 fixed frequency compressor	18	Port for inverter module voltage inspection
3	Air discharge temp. sensed port at the No.1 fixed frequency compressor	19	Mutual inductor for DC main lead current inspection
4	Air discharge temp. sensed port at the inverter compressor	20	Activation port of inverter module
5	Power supply port in the Mid-adapted panel	21	Power supply connected port of the main control panel
6	Communication between indoor and outdoor units, indoor unit network, outdoor unit network and terminal of network accounting	22	ON/OFF signal input port for system low pressure inspection
7	Phase inspection port	23	ON/OFF signal input port for system Hi-pressure inspection
8	Power input of the No.1 transformer	24	Input port for system pressure inspection
9	Power input of the No.2 transformer	25	Inspection port for outdoor ambient temp. and condenser coil temp.
10	Loading output terminal	26	Current inspection port of the inverter, No.1 and No.2 fixed frequency compressors
11	NO.2 EXV activation port	27	Communication ports among outdoor units
12	NO.1 EXV activation port	28	Control port of DC fan 1
13	Loading output terminal	29	Control port of DC fan 2
14	Loading output terminal	30	Reserve
15	Loading output terminal	31	C phase power supply
16	Power output of the No.1 transformer	——	

SW1 Query Instruction

Table 7

No.	Display content	Note	No.	Display content	Remark
1	ADDR of outdoor unit	0,1,2,3,4	13	Discharge temp. of inverter compressor	Actual value
2	Cap. of outdoor unit	8,10,12,14,16	14	Discharge temp. of Fixed No.1 compressor	Actual value
3	Qty .of Modular outdoor unit	Effective to master unit	15	Discharge temp. of Fixed No.2 compressor	Actual value
4	Total cap. of outdoor unit	Cap. need	16	Current of inverter compressor	Actual value
5	Cap. REQT of indoor unit	Effective to master unit	17	Current of Fixed No.1 compressor	Actual value
6	Cap. REQT of master unit after correction	Effective to master unit	18	Current of Fixed No.2 compressor	Actual value
7	Running mode	0,1,2,3,4	19	Opening degree of EEV	Actual value ×8
8	Actual running cap. of outdoor unit	Cap. need	20	Discharge pressure	Actual value × 0.1MPa
9	Fan status	0,1,2,3,4,5,6,7,8,9	21	The mode limitation of Indoor units	0,1,2,3,4
10	T2B/T2 average temp.	Actual value	22	Quantity of indoor units	Actual value
11	T3 pipe temp.	Actual value	23	The latest malfunction or protection	If no, display 00
12	T4 ambient temp.	Actual value	24	——	End of query

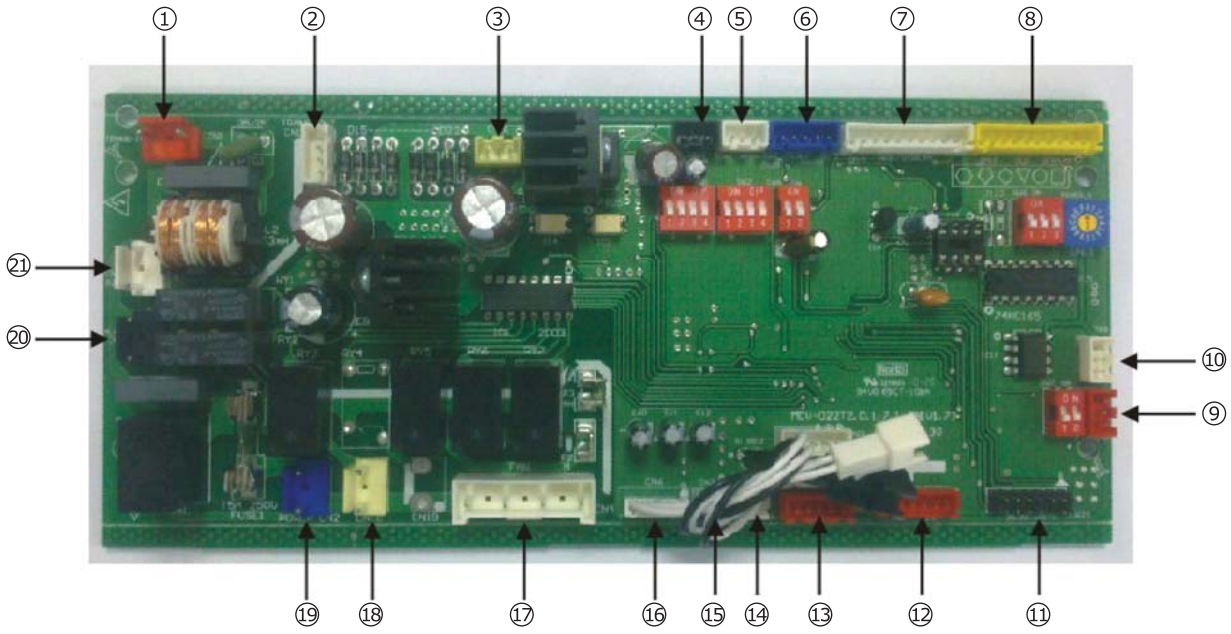
Remark:

1. Normal display: Display quantity of indoor units in standby state; while display frequency of compressor when capacity needed.
2. Running mode: 0 ☐ OFF; 1 ☐ FAN; 2 ☐ COOLING; 3 ☐ HEATING; 4 ☐ FORCED COOLING.
3. Fan speed: 0 ☐ OFF; 1~9 ☐ Speed increasing in turn; 9 ☐ the highest fan level.
4. PMV opening: pulse count=displayed value×8.
5. ENC1: Outdoor unit ADDR setting switch.
6. ENC2: Outdoor unit capacity setting switch.
7. ENC3: Network ADDR setting switch.
8. SW1: Query button key
9. SW2: Constraint cool button key.
10. The outdoor units of 4TVH0086-0115 exclude the discharge temp. and current of fixed compressor No2. (including the wiring with CT2 current inductor and HEAT2)

Description of Main Control Board of Indoor unit

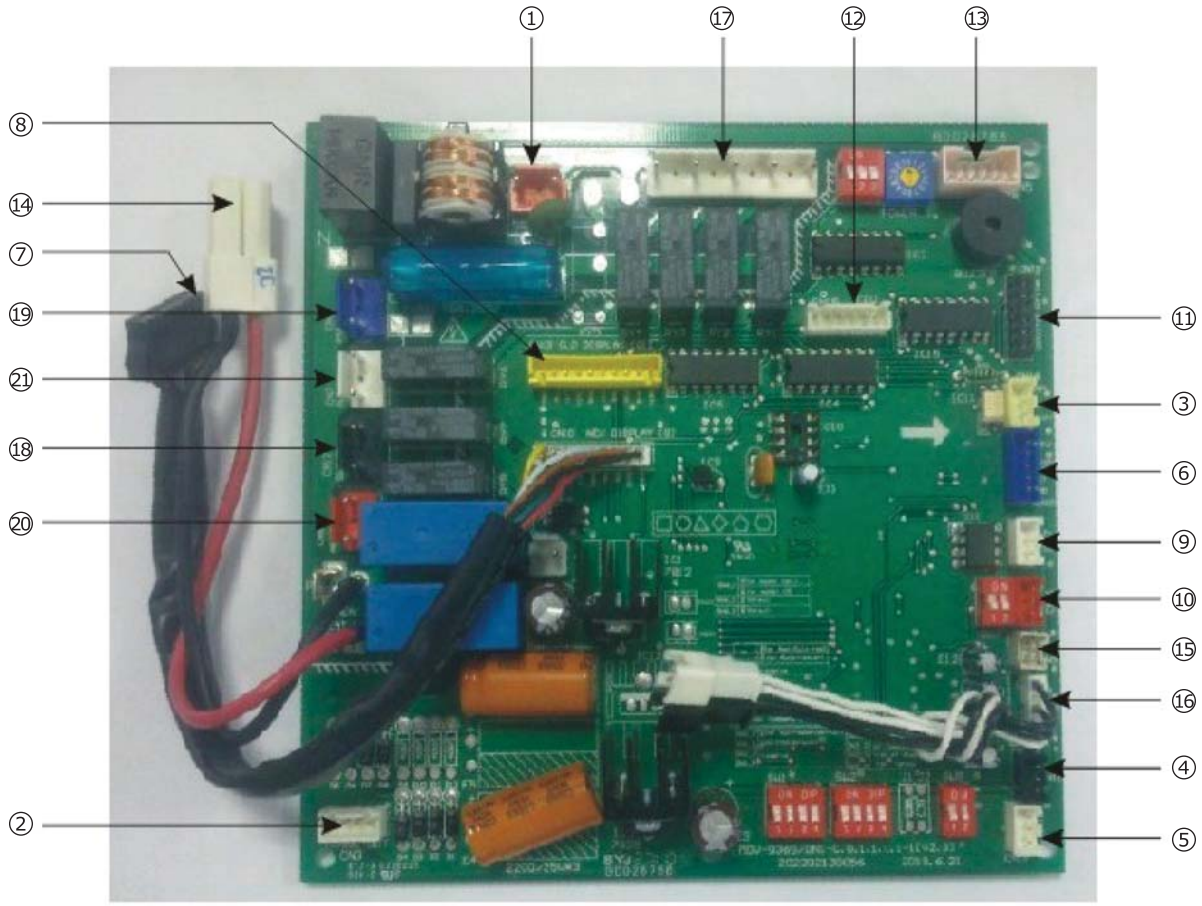
There are two shapes of main control board that are used for all types of indoor unit matching with TVR™ II outdoor unit.

Figure 2



Shape 1

Figure 3



Shape 2

Dial codes definition

Table 8

0/1 definition

ON	Means 0
ON	Means 1

Table 9

SW1 definition

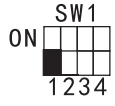
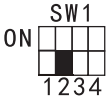
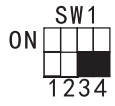
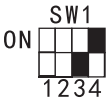
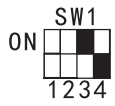
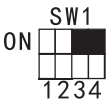
	1 means factory test mode 0 means default auto addressing mode		1 means DC fan is chosen 0 means AC fan is chosen
	00 means DC fan static pressure is 0 (reserved)		01 means DC fan static pressure is 1 (reserved)
	10 means DC fan static pressure is 2 (reserved)		11 means DC fan static pressure is 3 (reserved)

Table 10

SW2 definition

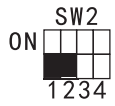
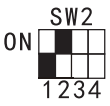
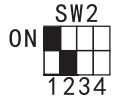
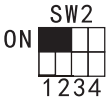
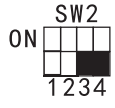
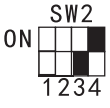
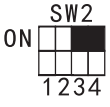
	00 means shutting down the unit to stop cold air at 15°C		01 means shutting down the unit to stop cold air at 20°C
	10 means shutting down the unit to stop cold air at 24°C		11 means shutting down the unit to stop cold air at 26°C
	00 means the time of stopping fan (when no capacity needed) is 4 minutes		01 means the time of stopping fan (when no capacity needed) is 8 minutes
	10 means the time of stopping fan (when no capacity needed) is 12 minutes		11 means the time of stopping fan (when no capacity needed) is 16 minutes

Table 11

SW5 definition

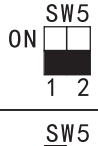
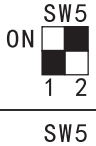
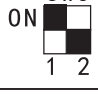
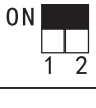
	00 means temperature compensation value is 6°C under heating mode		01 means temperature compensation value is 2°C under heating mode
	10 means temperature compensation value is 4°C under heating mode		11 means temperature compensation value is 8°C under heating mode

Table 12

SW6 definition

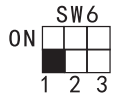
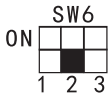
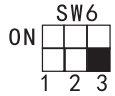
	1 means old display panel 0 means new display panel		1 means auto air blow under auto mode 0 means auto air blow under non-auto mode
	reserved		

Table 13

SW7 definition

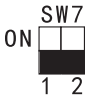
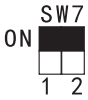
	Normal configuration		Last unit of the network

Table 14

J1 J2 definition

	Without jumper J1 for auto restart function		With jumper J1 for non-auto restart function
	reserved		

Error code & indication

Table 15

Without address when first time power on	Time LED and run LED flash together, or display FE
M_Home non-matching	4 LED flash together or display H0
Modes conflict	Defrost LED flashes or display E0
Communicative error between indoor and outdoor units	Timer LED flashes or display E1
Temperature sensor T1 error	Run LED flashes or display E2
Temperature sensor T2 error	Run LED flashes or display E3
Temperature sensor T2B error	Run LED flashes or display E4
EEPROM error	Defrost LED flash slowly or display E7
Outdoor unit error	Alarm LED flashes slowly or display ED
Water level alarm	Alarm LED flash or display EE

Explanation of main board

Table 16

No.	Content	No.	Content
1	Power input of transformer	12	Electric expansion valve drive port
2	Power output of transformer	13	Swing motor drive ports
3	Port for remote ON/OFF switch	14	Port for electric auxiliary heater
4	Port for infrared sensor	15	Indoor evaporator outlet pipe temp. detect port
5	Water level switch	16	Indoor ambient and evaporator middle part temp. detect port
6	Port for network module	17	Port for indoor fan motor
7	Port for new display board	18	Reserved
8	Port for old display board	19	Power input port
9	Communication port of X Y E	20	Port for alarm
10	Communication port of P Q E	21	Port for water pump
11	Port for on-line writing program	——	

New Added Function—Auto Addressing

- New Auto-Addressing is just a newly designed indoor-address distributed method which will be automatically completed outdoor unit, without manual addressing. When the unit is under testing, as the outdoor and indoor units are powered on simultaneously, the outdoor unit will automatically distribute different address to every indoor unit in less than 10 minutes.
- With regarding to the customer's desire of some kind fixed address or regular addresses for all indoor units, it can be achieved by wireless remote controller.

Figure 4

Electrical Wiring Installations

Highlights of electrical installation

- Please separately design the special power of indoor units and outdoor units.
- The power adopts special circuit, and installs creepage protector and manual switch.
- The indoor units' power, creepage protector and manual switch connected to the same outdoor unit must be general. All indoor units must be of the same circuit, and powered on or off simultaneously. Otherwise, system life will be seriously effected, and un-resolvable situation will occur.

- Please use 3-core shielded wiring for the communication line between indoor and outdoor units. Be noted not to use the multi-core wiring without shielded affect, for the interference would be reduced.
- Purchased wiring, parts and materials should be in compliance with the local and national regulations.
- All field wiring construction should be finished by qualified electrician.
- Air conditioning equipment should be grounded according to the relevant local and national electrical regulations.
- Current leakage protection switch should be installed (select current leakage breaker in light of the 1.5-2 times of total loading rated current.)
- When connecting wiring and wire holder, use cable clamp to fix and make sure no exposure.
- Refrigerant piping system and wiring system of indoor and outdoor unit should belong to the different system.
- Do not connect the power wire to the terminal of signal wire.
- When power wire is parallel with signal wire, put wires to their own wire tube and remain proper gap (the current capacity of power wire is: 10A below 300mm, 50A below 500mm).
- Voltage discrepancy of power wire terminal (side of power transformer) and end voltage (side of unit) should be less than 2%. If its length could not be shortened, thicken the power wire. Voltage discrepancy between phases shall not pass 2% rated value and Current discrepancy between highest and lowest phase should be less than 3% rated value.

Selection of wiring

- The selection of wiring area shall be in accordance with the requirements below:
  1. Voltage lose of wire shall meet the requirement of terminal voltage for normal operation and startup.
  2. The wiring current-carrying capacity determined by installed method and environment is not less than the largest current of unit.
  3. Conductor shall ensure the stability of movement and heating.
  4. The conductor's smallest sectional area should satisfy the requirement of mechanical strength.

     When earth protection line (shortly called PE line) is made of material the same as phase line, the smallest sectional area of PE line should be in accordance with the regulation below:

Table 17

Sectional area of core to phase line S (mm^2)	Smallest sectional area of PE line (mm^2)
S≤16	S
16<S≤35	16
S<35	S/2

Distribution highlights of distribution wiring

- When distributing wiring, select wirings with different colors for phase line, zero line and protection earth according to relevant regulations.

- The power wire and control wire of concealed engineering is prohibited to bind together with refrigerant piping. It is necessary to pass through wire tube and be distributed separately, and the gap between control line and power wire should be 500mm at least.
- When distributing wiring by passing through pipe, the following should be paid attention to:

1. Metal wire tube could be used in indoor and outdoor units, but it is unsuitable to be exposed to place with acid-alkali corrosion.
2. Plastic wire tube is generally adopted for indoor units or place with corrosion, but it should not be exposed to place with mechanical damage.
3. The wiring through pipe shall not be in the form with ends jointing. If there must be joint, connection box should be installed at the corresponding place.
4. The wiring with different voltage should not pass through the same wire tube.
5. Total sectional area of wiring through wire tube shall not exceed 40% valid area of stuffing tube.
6. Fixing point of wire tube support shall follow the standard below:

Table 18

Normal diameter of wire tube	Largest gap between fixed points of wire tube	
mm	Metal pipe	Plastic pipe
15~20	1.5m	1m
25~32	2m	1.5m
40~50	2.5m	2m

Outdoor unit power wiring selection

- Separate Power Supply without power facility.

Table 19

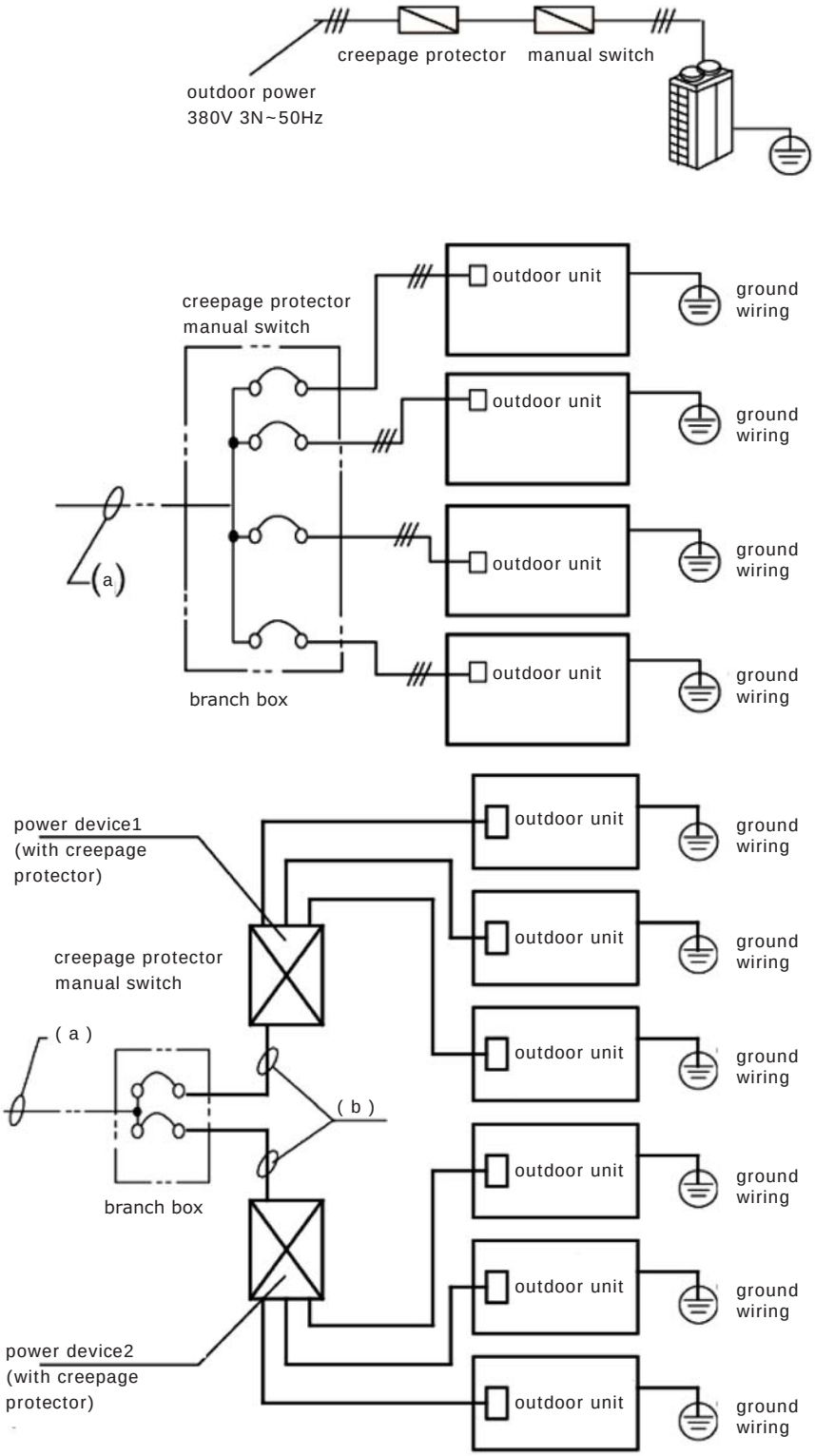
Model	Power	The shortest wiring dia. (mm)			Manual switch (A)		Creepage protector
		≤20m	≤50m	GND	Capacity	Fuse	
4TVH0086	380~415V 3N~50Hz	4×10	4×16	10	75	50	<100mA, 0.1sec
4TVH0096		4×10	4×16	10	75	50	<100mA, 0.1sec
4TVH0115		4×10	4×16	10	75	50	<100mA, 0.1sec
4TVH0135		4×16	4×25	16	100	70	<100mA, 0.1sec
4TVH0155		4×16	4×25	16	100	70	<100mA, 0.1sec

Note:

The length in the table equals the value of power cord connecting outdoor units, indicating the condition that the voltage dropping range is within 2%. If the length exceeds the above figure, please select the wire diameter according to relevant standard.

- With power facilities.

Figure 5



1. Select the wire diameter, refer to the following table. (≥) (unit: mm^2)

Table 20

(unit: mm^2)

Model	<20m	<50m
4TVH0086AD	10	16
4TVH0096AD	10	16
4TVH0115AD	10	16
4TVH0135AD	16	25
4TVH0155AD	16	25
4TVH0182AD	16	25
4TVH0192AD	16	25
4TVH0211AD	16	25
4TVH0231AD	25	35
4TVH0251AD	25	35
4TVH0270AD	25	35
4TVH0290AD	35	50
4TVH0310AD	35	50
4TVH0327AD	35	50
4TVH0347AD	35	50
4TVH0366AD	35	50
4TVH0386AD	35	50
4TVH0405AD	50	70
4TVH0425AD	50	70
4TVH0445AD	50	70
4TVH0465AD	50	70
4TVH0492AD	70	95
4TVH0502AD	70	95
4TVH0521AD	70	95
4TVH0541AD	70	95
4TVH0560AD	70	95
4TVH0580AD	70	95
4TVH0600AD	70	95
4TVH0620AD	70	95

Power wiring refers to the main wire (a) connecting to branch box and the wiring (b) between branch box and power facilities. Please select the wire diameter according to the following requirement.

Diameter of main wire (a): Depends on the total capacity of outdoor unit and the above table.

E.g. In system: (8HP×1unit+8HP×1unit+10HP×1unit), total HP=26HP→ refer to the above table →size of wire=35 mm^2 (within 50m)

Diameter of wiring (b): between branch box and power equipment. Depend on the total capacity of downward outdoor unit and the above table.

E.g. In system: (8HP×1unit+8HP×1unit+10HP×1unit), total HP=26HP→refer to the above table→size of wire=35mm^2 (within 50m)

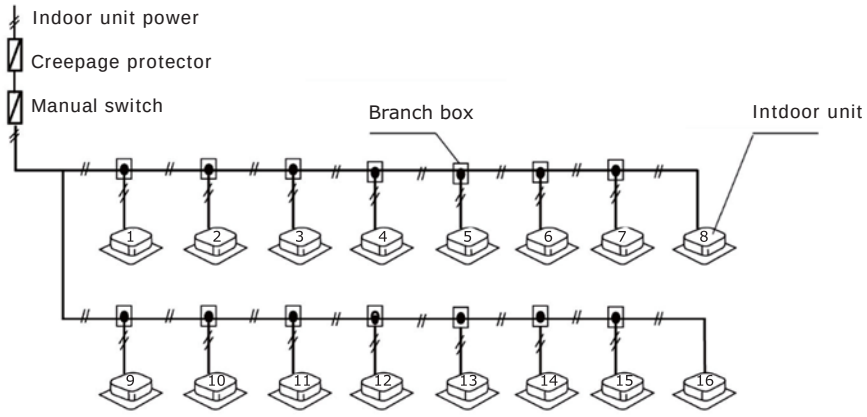
2. Select the capacity of manual switch and fuse of the branch box, which is dependent on the total capacity.

Table 21

Model	Manual switch (A)	Fuse (A)
4TVH0086 - 4TVH0115	32	25
4TVH0135 - 4TVH0155	40	35
4TVH0182 - 4TVH0211	63	50
4TVH0231 - 4TVH0270	80	63
4TVH0290 - 4TVH0327	80	70
4TVH0347 - 4TVH0386	100	80
4TVH0405 - 4TVH0465	125	100
4TVH0492 - 4TVH0541	150	125
4TVH0560 - 4TVH0620	200	150

Indoor unit power wiring selection

Figure 6



Note:

- ***Set refrigerant piping system, signal wires between indoor-indoor unit, and that between outdoor-outdoor units into one system.***
- ***Please do not put the signal wire and power wire in the same wire tube; keep distance between the two tubes. (Current capacity of power supply: less than 10A--300mm, less than 50A--500mm.)***
- ***Make sure to set address of outdoor unit in case of parallel multi-outdoor units.***

Control System

Control System Introduction

Connecting highlights of control line (RS485 communication)

- Please use shielded wire for the control line, otherwise, signal interference and error operation would occur.
- The shielded nets at the two sides of shielded wires are either grounded to the earth, or connected with each other and jointed to the sheet metal along to the earth.
- Control wire could not be bound together with refrigerant pipeline and power wire. When power wire and control wire is distributed in parallel form, keep gap between them above 300mm so as to prevent signal interference.
- Control wire could not form closed loop.
- When connecting, be noted that control wire has polarity.

Selection of control wire specification

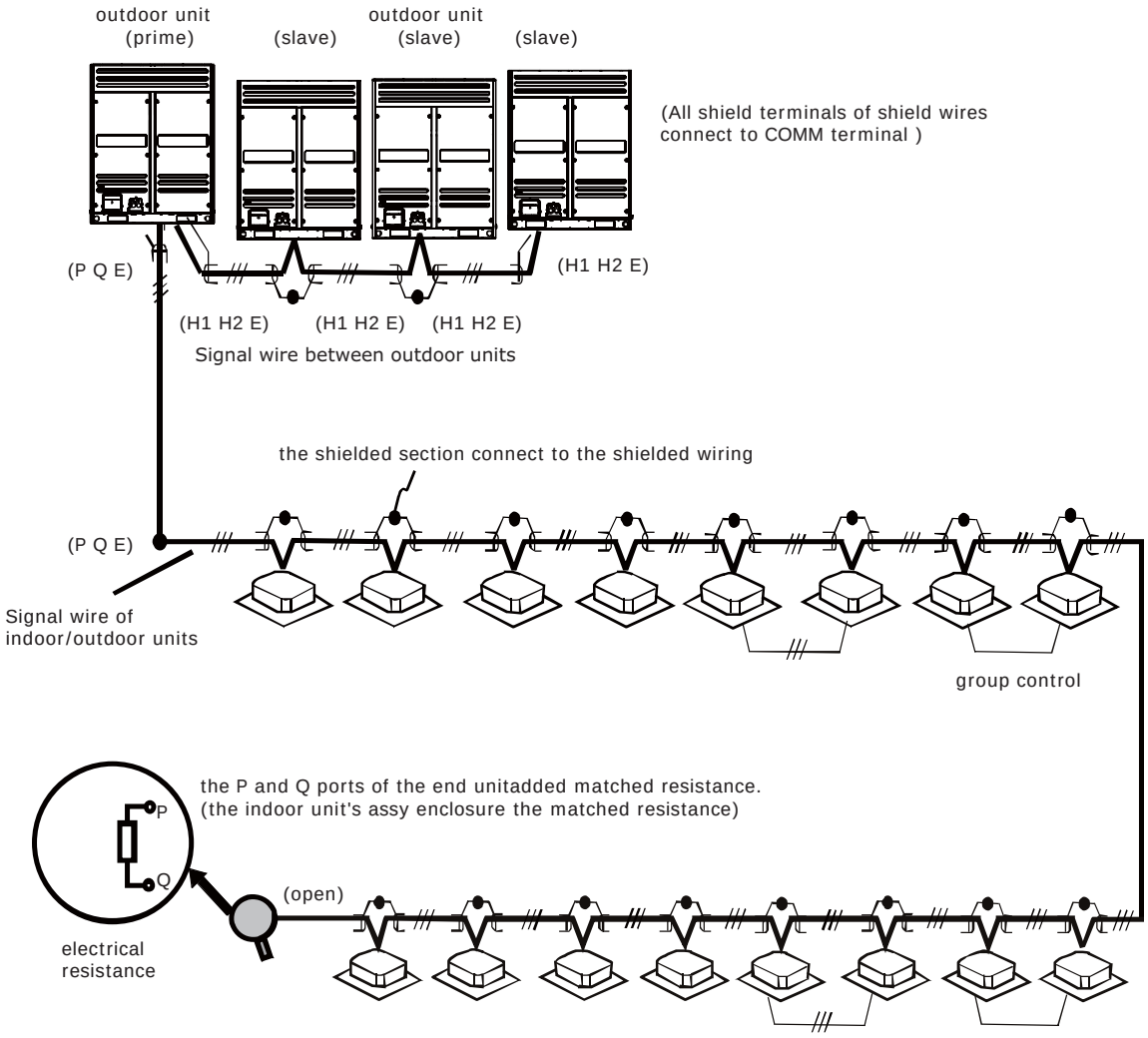
The ordinary shielded wire includes:

Table 22

Model	Name
AVP	Copper core PVC insulation shielded wire
AVP-105	Heat-resistant 105°C PVC insulation shielded wire
RVP	PVC insulation shielded flexible wire
RVP-105	Heat-resistant 105°C PVC insulation shielded flexible wire
RVVP	PVC insulation shielded PVC sheath flexible wire
RVVP1	PVC insulation entangled shielded PVC sheath flexible wire

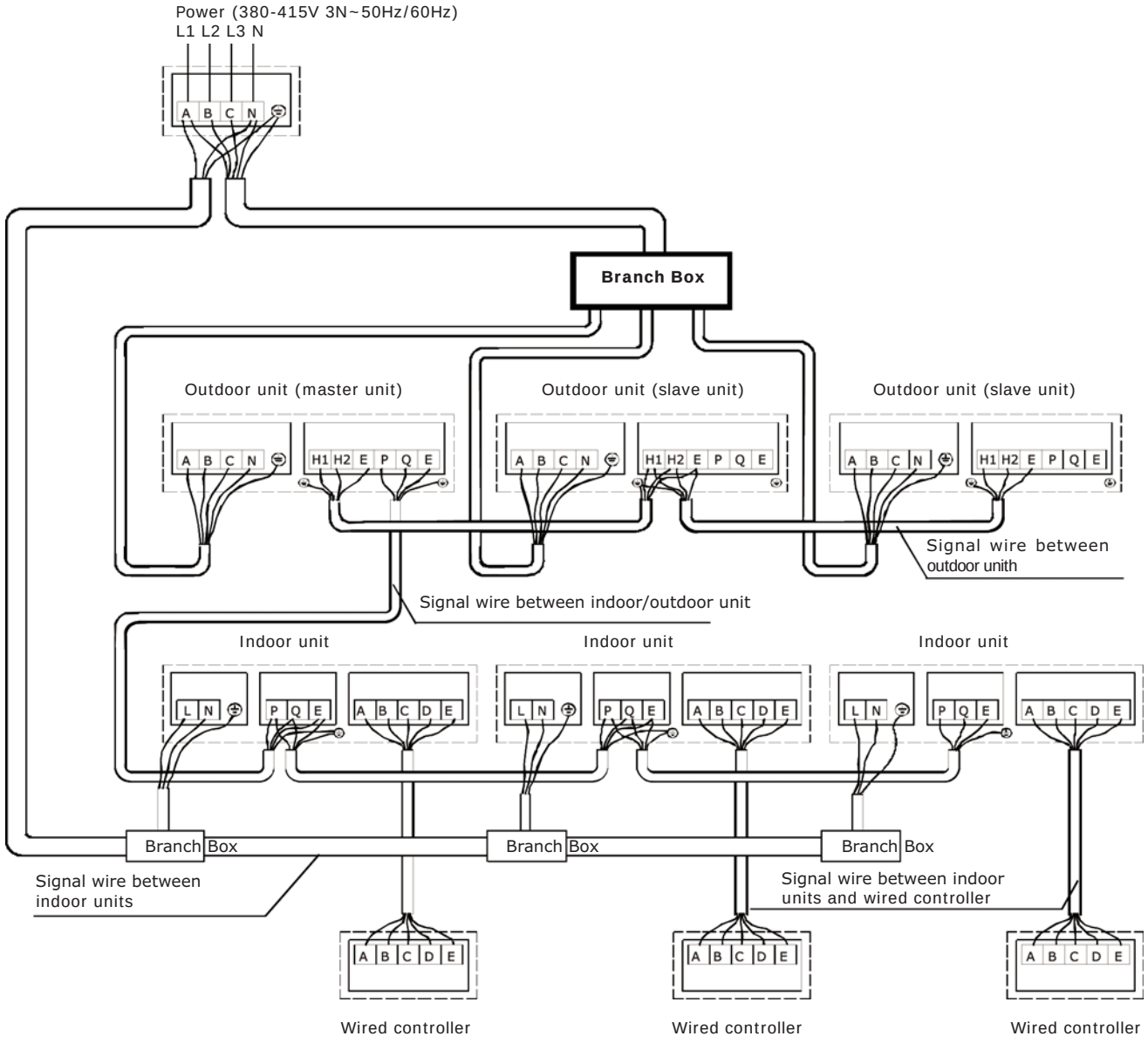
Signal wire of indoor/outdoor units

Figure 7



E.g. refer to the following example.

Figure 8

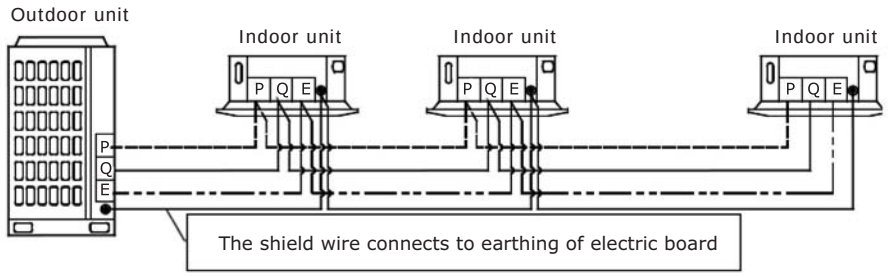


Note:

- ***The signal connecting line between outdoor units, indoor and outdoor units and indoor units has polarity. When connecting, be careful to prevent error connection.***
- ***Signal wire shall adopt three-core shielded wire with the dia. no less than 0.75m^2.***
- ***The signal wire of indoor unit and outdoor unit must only connect to the prime outdoor unit.***
- ***Do not bind signal wire and copper pipe together with belting.***

1. Correct connection

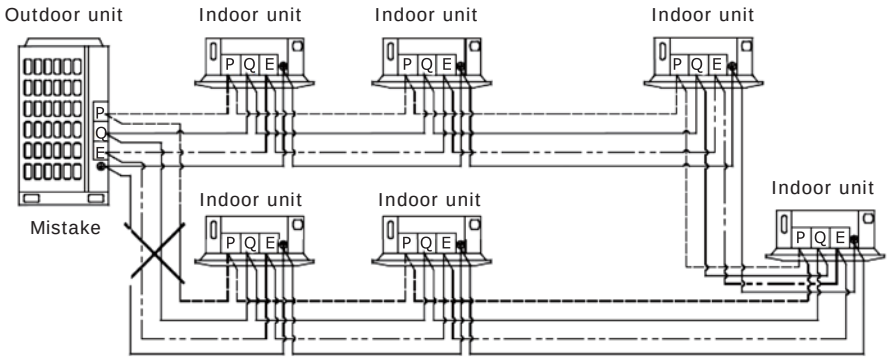
Figure 9



2. Typical wrong connection

a. Loop connection of signal wire

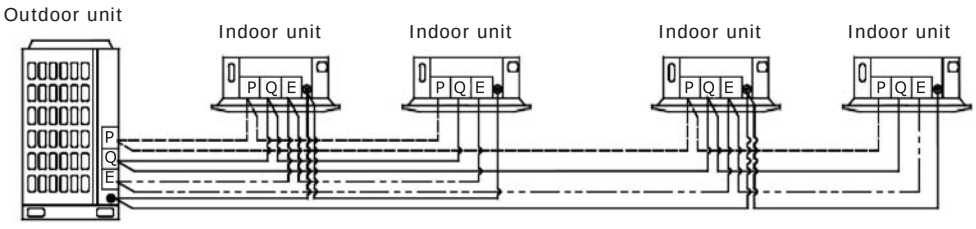
Figure 10



b. Star connection of signal wire

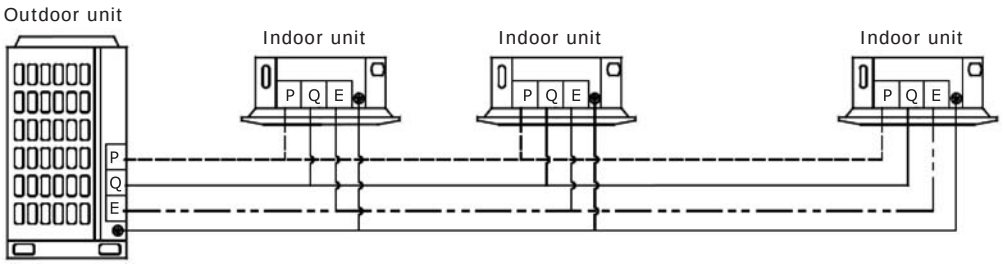
- Star connection of part signal wires

Figure 11



3. Star connection of all signal wires

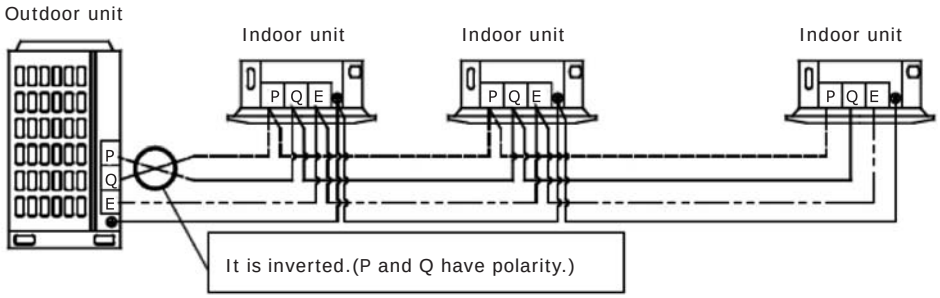
Figure 12



c. Reverse connection of signal wire

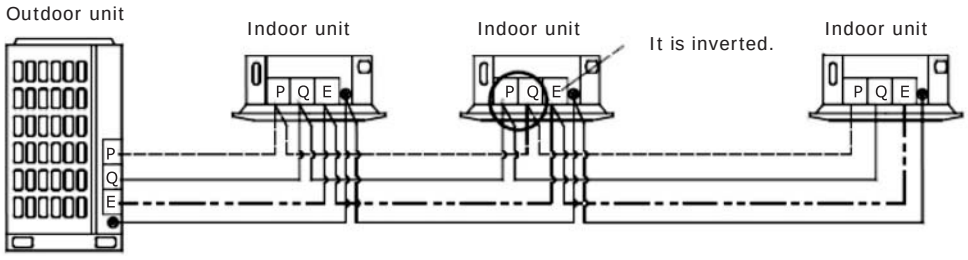
- Outdoor unit — indoor unit

Figure 13



- Indoor unit — indoor unit

Figure 14



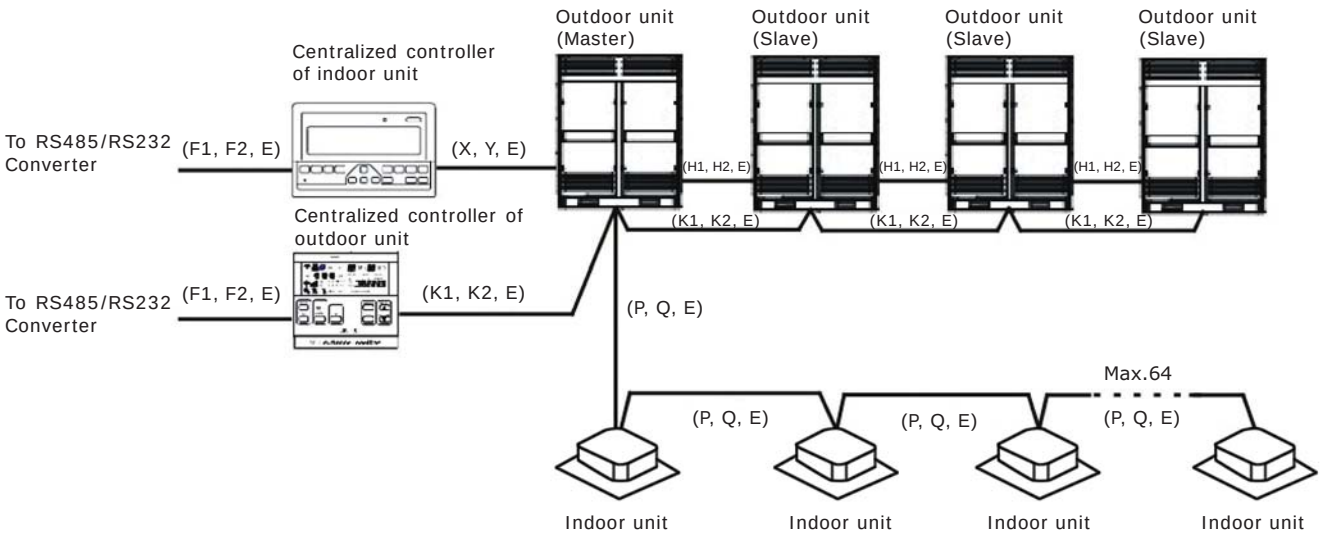
Caution: shielded layer should be connected to electrical panel.

Signal wire of centralized control

When centralized control is needed, one TMCCW001A (centralized controller of indoor unit) can only control the indoor units which are in the same refrigerant system **via the port X Y E of outdoor unit**. Outdoor unit will automatically distribute the address to indoor units without any manual setting. Remote controller can enquiry and modify every indoor unit address.

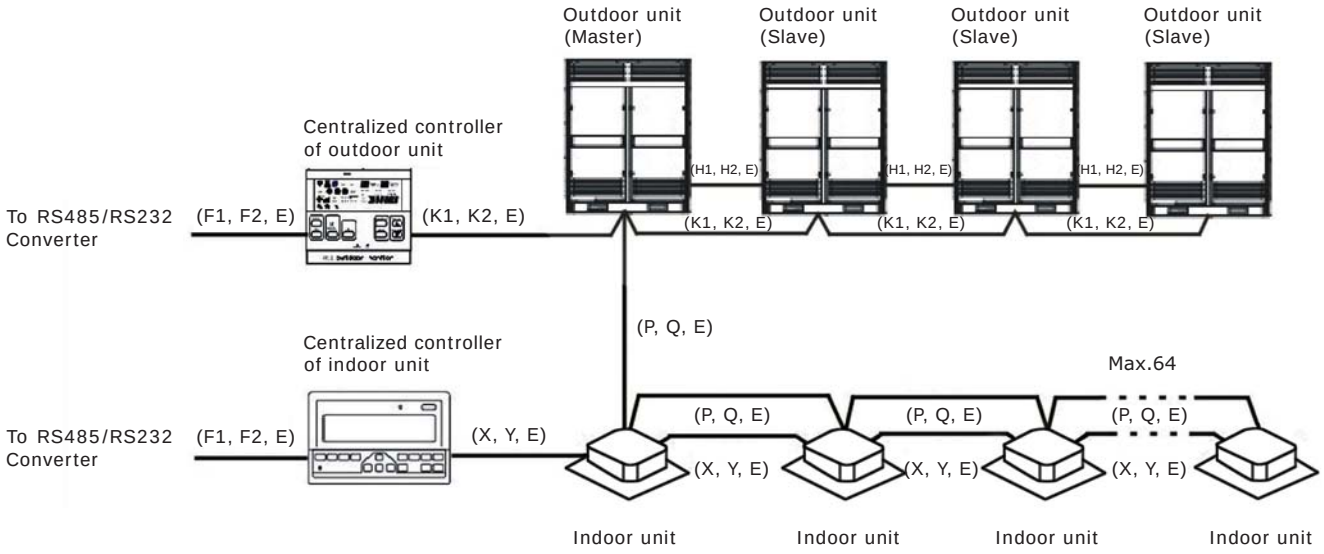
The diagram below shows the connection of signal wire in this case:

Figure 15



Besides, TMCCW001A can also connect indoor units via the port X Y E of indoor unit. However, one more group of wire (X Y E between indoor units) is needed; it is more complex and not suggested. Anyway, the diagram below shows the connection of signal wire in this case:

Figure 16



Controller introduction

Table 23

Controller and assy.	Appearance	Model	Description
Wireless remote controller		TMUCR003A	General functions and without economic mode.
		TMUCR002A	Big screen and LCD display, with back light display, and clock function.
		TMUCR004A	Almost the same as TMUCR002A but with different appearance.
		TMUCR001A	General remote functions with address setting function.
Wired controller		TMUCW001A	Connection needs that the indoor unit display panel contains a corresponding port.
		TMUCW002A	The same as TMUCW001A, with added FOLLOW ME function.
		TMUCW003A	All basic function is the same as TMUCW001A.
		TMUCW004A	Almost the same as TMUCW003A, with the only difference being that running mode is fixed to cool mode to avoid mode conflict.

Central control monitor		TMCCW001A	Centralized controller of indoor units. It can control up to 64 indoor units and be able to check the indoor unit individually or all units. It can connect to network control system. It adds mode lock, blue back light display and mode memory function in a big screen appearance.
		TMCCW002A	The weekly centralized controller of indoor unit. which could control up to 64 indoor units maximally and in possession of week schedule function, but could not connect to network control system.
		TMCCW003A	New general controller of indoor unit. It is only switch, which cannot change special mode, but it can simultaneously switch max. 16 indoor units.
		TOCCW001A	The centralized controller of outdoor unit, which could monitor max. 32 outdoor units.
Building gateway		TSNCA001A	Building gateway connects to Lonworks® network for integrating to other BMS to realize air conditioner manage and control, which is free from any need to match Trane network system and PC.
		TSNCA002A	Building gateway connects to BAKNET network for integrating to other BMS to realize air conditioner manage and control, which is free from any need to match Trane network system and PC.
Network control software		TSNSA001A	The network control software with Firebird data. It is added with network fee charge function and could connect to the outdoor unit TOCCW001A. It may connect to 16 indoor unit TMCCW001A and 1024 indoor units, and also connect to 16 outdoor unit TOCCW001A and 128 refrigeration systems.
Hotel inserting card module		TMNCA001A	Match hotel card system to control the air conditioner.
Digital ammeter		TSNEA002A	Send the electric energy data to outdoor unit for realizing network fee charge function.
Room temperature management module		TMNCA002A	Automatically turn off and turn on the indoor unit for energy-saving.

Wireless Remote Controller

Table 24

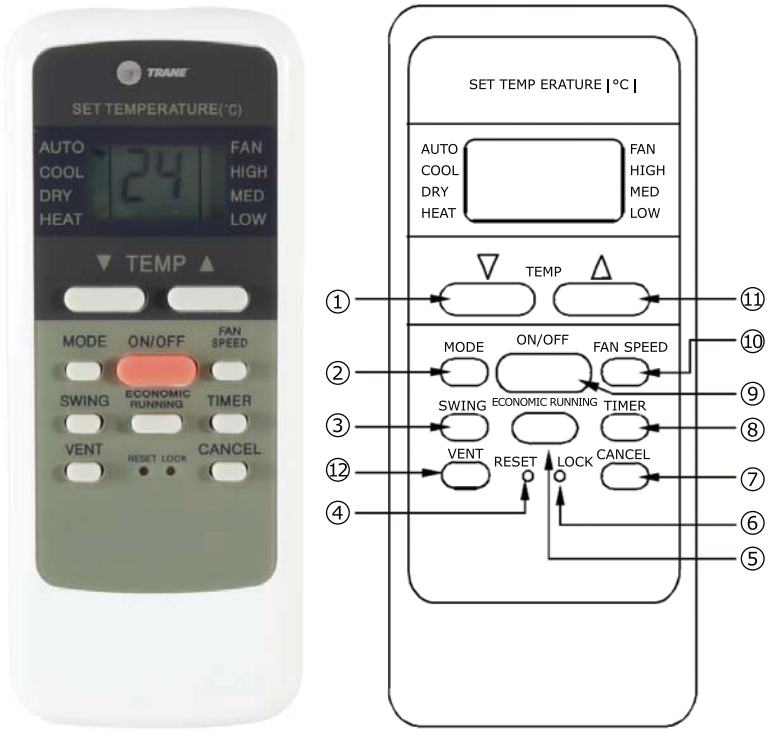
Controller and assy.	Appearance	Model	Description
Wireless remote controller		TMUCR003A	General functions and without economic mode.
		TMUCR002A	Big screen and LCD display, with back light display, and clock function.
		TMUCR004A	Almost the same as TMUCR002A but with different appearance.
		TMUCR001A	General remote functions with address setting function.

Wireless remote controller TMUCR003A

Apply to One-way/ Four-way cassette/ Concealed type/ High wall type/ Convertible type

Buttons and functions descriptions

Figure 17



① **TEMP**: Press the TEMP button to decrease the indoor temperature setting or to adjust the TIMER in a counter-clockwise direction.

② **MODE**: Each time you Press the button, a mode is selected as the following figure indicates:

AUTO (COOL) → COOL → DRY → HEAT → FAN

Note: "HEAT" is only for heat pump AC.

③ **SWING**: press this button to change the louver angle.

④ **RESET**: Upon press this button, all current setting will be cancelled and the control will return to the initial settings.

⑤ **ECONOMIC RUNNING**: Press this button to shift to energy-saving mode.

⑥ **LOCK**: Press this button to lock all the current setting; and press it again to unlock.

⑦ **CANCEL**: Press this button to cancel the TIMER settings.

⑧ **TIMER**: Preset the time ON (start to operate) and the time OFF (turn off the operation).

⑨ **ON/OFF**: Press this button to start or stop the operation.

⑩ **FAN SPEED**: This button is used for setting Fan Speed in the sequence that goes from AUTO, LOW, MED to HIGH, then back to Auto.

⑪ **TEMP**: Press the button to increase the indoor temperature setting or to adjust the TIMER in a clockwise direction.

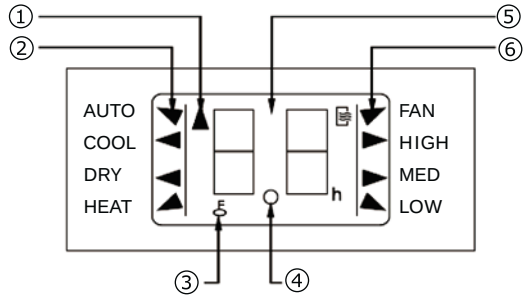
⑫ **VENT**: Press this button to set the ventilating mode. The ventilating mode will operate in the following sequence:

Continuous → Auto → Off

Note: ventilation function is available for the fresh air series.

LCD display indications:

Figure 18



1--TRANSMISSION Indicator; 2--MODE Display; 3--HEAT PUMP ONLY-LOCK display; 4--TIMER Display; 5--FAN Display; 6--Digital Display Area.

Wireless remote controller TMUCR001A, TMUCR002A

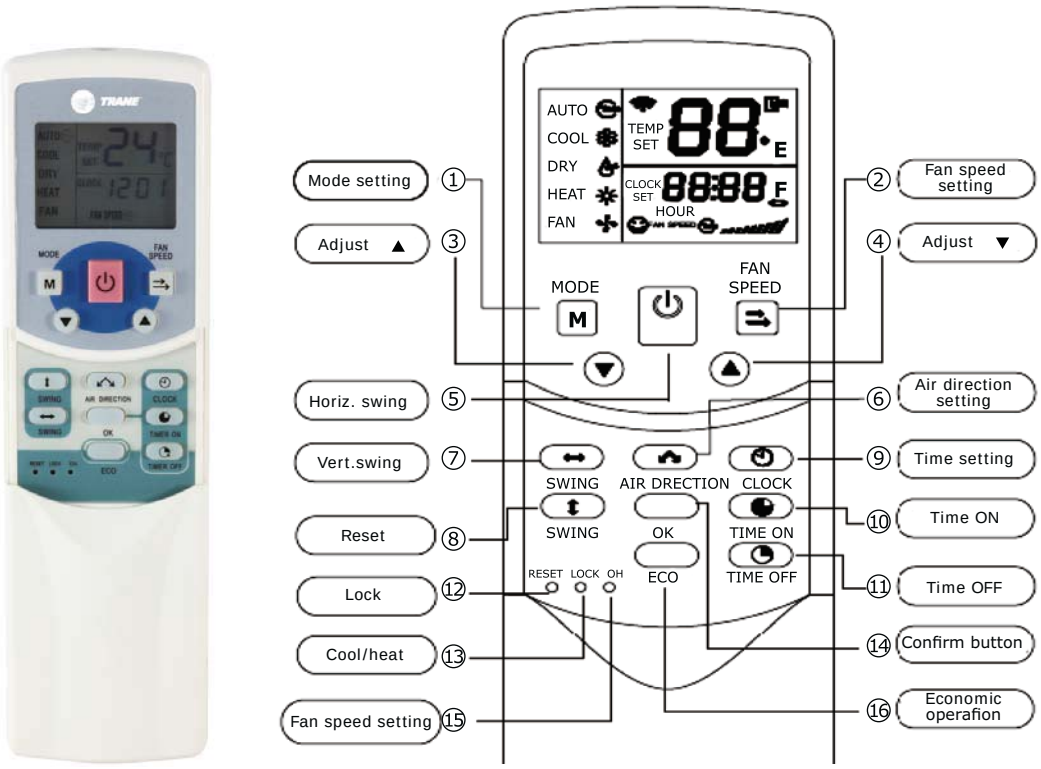
Apply to One way / Four-way cassette / Low static pressure concealed type / High-wall / Convertible type.

Table 25

Model	TMUCR002A
Rated Voltage	3.0V (2 pieces of LR03 7# batteries)
Lowest Voltage	2.4V
Effective Distance	8m~11m
Operation Condition	-5°C~60°C

- **Descriptions of the functions for each button**

Figure 19



① **MODE**: Each time you press the button, a mode is selected as the following figure indicates:

AUTO (COOL) → COOL → DRY → HEAT → FAN

Note: "HEAT" is only for heat pump AC.

② **FAN SPEED**: This button is used for setting Fan Speed in the sequence that goes from AUTO, LOW, MED to HIGH, then back to Auto.

③ **TEMP**: Press the TEMP button to decrease the indoor temperature setting or adjust the TIMER in a counter-clockwise direction.

④ **TEMP**: Press the button to increase the indoor temperature setting or adjust the TIMER in a clockwise direction.

⑤ **ON/OFF**: Press this button to start or stop the operation.

⑥ **SWING**: Press this switch button to change the louver angle.

⑦ **CANCEL**: Press this button to cancel the TIMER settings.

⑧ **Air direction**: Activate swing function of air deflector. Once pressed, air deflector will turn 6 degrees.

⑨ **CLOCK**: Used for time-setting.

⑩ **TIME ON**: turn on the timer operation.

⑪ **TIME OFF**: turn off the timer operation.

⑫ **RESET**: Upon press this button, all the current setting will be cancelled and then return to the initial settings.

⑬ **LOCK**: Press this button to lock all the current settings and press it again to unlock.

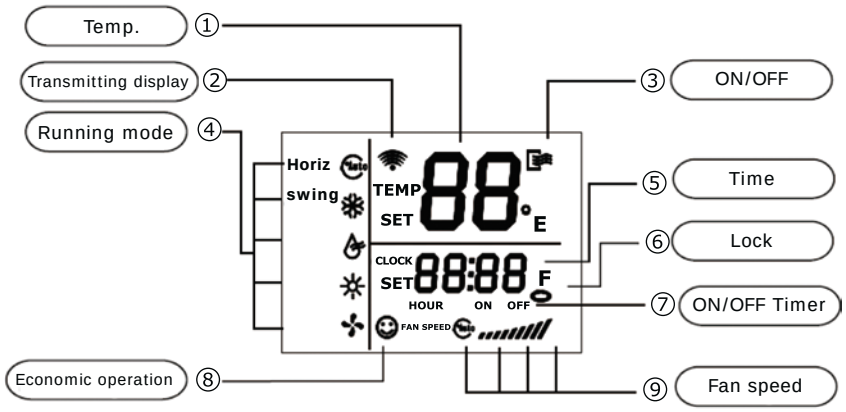
⑭ **OK**: Used to confirm the time settings and modification.

⑮ **C/H**: This button is used for the shift between Cooling mode or Cooling/Heating mode.

⑯ **ECONOMIC RUNNING**: Press this button to go into the Energy-Saving operation mode.

- **LCD display indications:**

Figure 20



① **Temp**: Display the setting temperature.

② **Transmitting display**: This indicates that the remote controller is sending data.

③ **ON/OFF**: This indicates that the machine is on .

④ **Running mode**: This indicates the machine's running mode. Heating mode need the corresponding type of unit.

⑤ **Time**: Display the current time. User could press the CLOCK button for 5s to make this flash, then user could adjust the time by using the ▲and ▼ buttons. Once time is right, press the OK button to confirm.

⑥ **Lock**: When displayed, all the button is invalid except the lock button.

⑦ **ON/OFF Timer**: This indicates the timer is working or not.

⑧ **Economic operation**: Indicates that whether the machine is working at the economic operation.

⑨ **Fan speed**: Shows the indoor unit's fan speed. The longer it's displayed, the stronger the wind blows.

Note:

TMUCR001A is able to set the indoor units' addresses individually. Please refer to the summary for the details.

Wireless remote controller TMUCR004A

The same as TMUCR002A, only with different appearance.

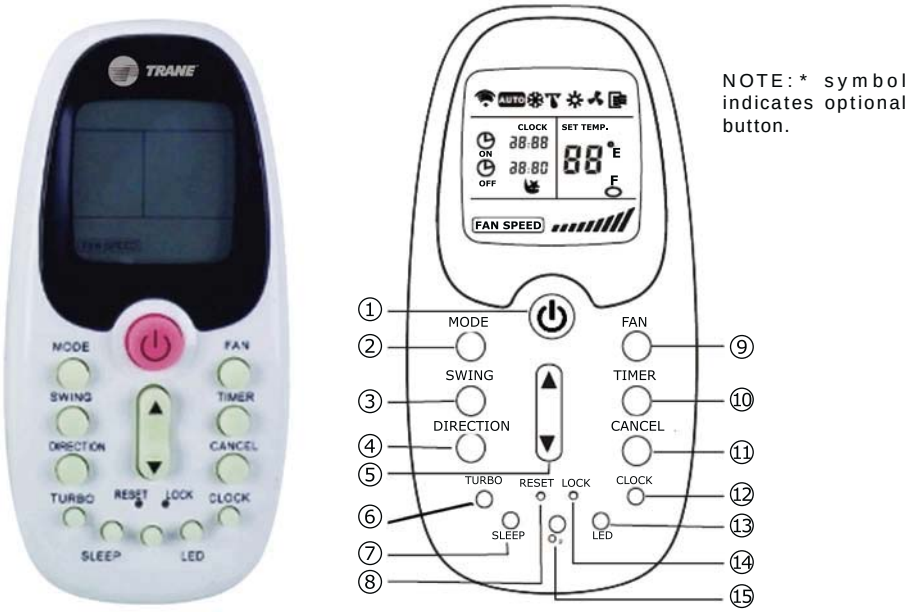
1. Operating Mode: AUTO, COOL, HEAT, DRY, and FAN.
2. Timer Setting Function in 24 hours.
3. Indoor Setting Temperature Range: 17°C~30°C.
4. LCD (Liquid Crystal Display) of all functions.

Table 26

Model	R05/BGE
Rated Voltage	3.0V (Alkaline dry batteries LR03×2)
Lowest Voltage of CPU Emitting Signal	2.0V
Transmission Distance	8m (when using 3.0 voltage, it gets 11m)
Environment	-5°C~60°C

- **Descriptions of the functions for each button**

Figure 21



NOTE: * symbol indicates optional button.

ON/OFF Button: Press this button to start or stop operation.

MODE Button: Each time you press the button, a mode is selected in a sequence that goes from AUTO, COOL, DRY, HEAT and FAN.

NOTE: COOL only model has no HEAT feature.

SWING Button: Press the button, and then the louver would swing up and down automatically. Press it again to retreat.

DIRECTION Button: Press this button to change the swing angle of the louver. The swing angle of the louver is 6° for each press. When the louver swing at a certain angle which would affect the cooling and heating effect of the air conditioner, it would automatically change the swing direction. No symbol will appear in the display area when press this button.

TEMP/TIME Button: Press the button to increase the indoor temperature setting or adjust the TIMER in a clockwise direction. Press the button to decrease the indoor temperature setting or adjust the TIMER in a counter-clockwise direction.

TURBO Button: Press this button in cooling mode so as to shift into powerful cooling operation. And press it again to retreat.

SLEEP Button: Press this button to go into Energy-Saving mode. This function is available in COOL, HEAT, and AUTO mode, to create the most comfortable temperature for you.

NOTE: While the unit is running under SLEEP operation mode, it would be canceled if you press the other button.

RESET Button: Press this button to cancel all the current settings and return to the initial settings.

FAN Button: Press this button to select the Fan Speed from AUTO, LOW, MED or HIGH.

TIMER Button: This button is used to preset the time ON (start to operate) and the time OFF (turn off the operation).

CANCEL Button: Press this button to cancel the ON/OFF TIMER settings.

CLOCK Button: Used for time-setting.

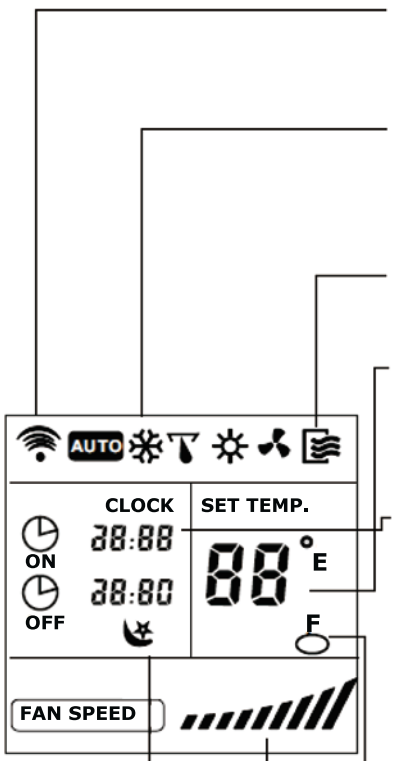
LED Button: Press this button to clear away the digit display in the air conditioner. Upon another press, the display will be activated.

LOCK Button: Press this button to lock all the current settings. And press it again to unlock.

O_2 Button (optional): Press this button to activate the oxygen generating mechanisms, and then the oxygen density of the indoor units would vary. Also press it again to retreat.

- **LCD display indications**

Figure 22



Transmission Indicator

This transmission indicator would light when the remote controller transmits the signals to the indoor units.

Mode display

Displays the current operation mode, including AUTO (AUTO), COOL ( ), DRY ( ), HEAT ( ) (Invalid for cooling only models), FAN ONLY ( ) and back to AUTO (AUTO).

ON/OFF display

Displayed by pressing the ON/OFF button.
Press the ON/OFF button again to remove.

Temp. display

Displays the temperature setting (17°C to 30°C) . But no temperature setting would display in FAN ONLY mode.

Time display

Indicates timer on/off (0-23:50) or clock time. The clock time will be displayed only for the non-AUTO ON/OFF settings. otherwise only AUTO ON/OFF time would display. Press the LOCK button to check the current time.

Fan speed display

Displays the selected fan speed , AUTO(no display) and three fan speed levels " " (LOW) " " (MED) " " (HIGH) can be indicated. The fan speed is AUTO when the operating mode is either AUTO or DRY.

Lock Display

Display upon the press of LOCK button.

Sleep Display

Display upon the press of SLEEP button.
Press the SLEEP button again to remove.

Note:

All the displays on the remote controller are only for illustration purpose only.

Summary:

Table 27

Comparison of remote controllers

Function				
	TMUCR002A	TMUCR001A	TMUCR004A	TMUCR003A
On/Off	•	•	•	•
Cooling mode	•	•	•	•
Heating mode	•	•	•	•
Fan mode	•	•	•	•
Dehumi difying mode	•	•	•	•
Auto mode	•	•	•	•
Swing function	•	•	•	•
Economic mode	•	•	__	__
Remote controller lock	•	•	•	•
Fan speed control	•	•	•	•
Daily time setting	•	•	__	__
Background light	•	•	•	__
Current time	•	•	__	__
FOLLOW ME	__	__	__	__
Address setting	__	•	__	__

How to set address through Wireless Remote Controller

1. Press the LOCK button for more than 5 seconds, then the controller get into address setting mode.
2. Then press the ON/OFF button to start transmitting signal in the address setting mode. When working in address setting mode, ON/OFF button will be invalid for turning the controller off.
3. In the address setting mode, there are 2 main functions: Querying mode: Please point the remote controller to the indoor unit, then press MODE button, the corresponding indoor unit will display its address. Setting mode: Use the UP and DOWN buttons to choose an address you want. Then point the remote controller to the indoor unit and then press the FAN button to set the indoor unit's address. The corresponding indoor unit will display the new address and record it. After about 4 seconds, this displaying will fade out and the indoor unit turn to normal display mode.
4. After setting all the addresses, users can press the LOCK button for 5 seconds to quit the address setting mode.

Wired Controller

Table 28

Controller	Appearance	Model	Description
Wired controller		TMUCW001A	With general control function and connected to the indoor unit display panel's corresponding port.
		TMUCW002A	Almost the same with TMUCW001A, with added FOLLOW ME function.
		TMUCW003A	All basic function is the same as TMUCW001A
		TMUCW004A	Almost the same as TMUCW003A, except that the running mode is fixed to cool mode so as to avoid mode conflict.

Safety precautions:

Please read this safety precaution carefully before installation. Do observe the following safety precautions, for they are very important.

Confirm there is no abnormal phenomenon during test operation after installation completed. Then hand the manual to the user.

Installation must be conducted by professionals, for improper installation may cause electric shock or fire.

Installation must be conducted by professionals, for improper installation may cause electric shock or fire.

A random disassembly may cause abnormal operation or heating, thus result in fire.

Don’t install in a place exposed to combustible gas leakage, otherwise fire would be caused.

Select the suitable wire for the current of the controller, otherwise electricity leakage or heating may be caused.

Be noted not to impose outside force on the terminal, otherwise wire break or heating may be caused and further result in fire.

Installation location:

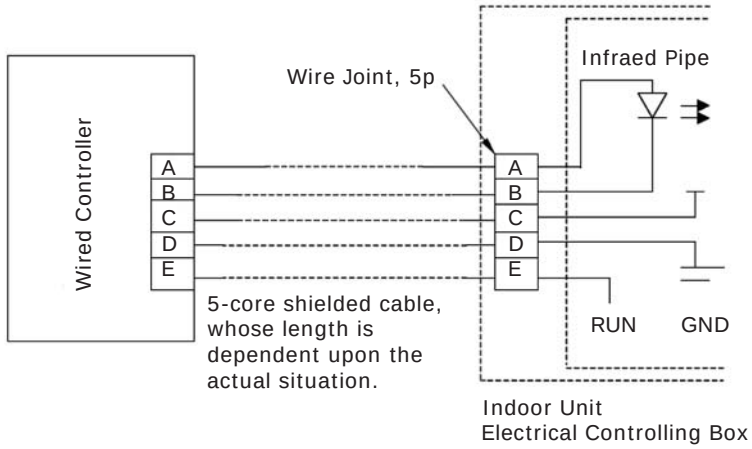
Do not install it in a place with oil, steam or sulphur gas, otherwise deform or malfunction may occur.

Note for wired controller installation:

- This installation manual contains information about the procedure of installing wired controller.

  Please refer to Indoor Unit Installation Manual for connecting wired controller and indoor unit.
- Circuit of the wired controller is of low voltage. Be noted not to connect it with a standard 220V/380V circuit or put it into a same wiring tube with the circuit.
- The shielded cable must be connected to the ground stably, otherwise transmission may fail.
- Do not attempt to extend the shield cable by cutting. Should it be unavoidable, use Terminal Connection Block to connect.
- After finishing connection, do not use Megger to have the insulation check to the signal wire.

Figure 23

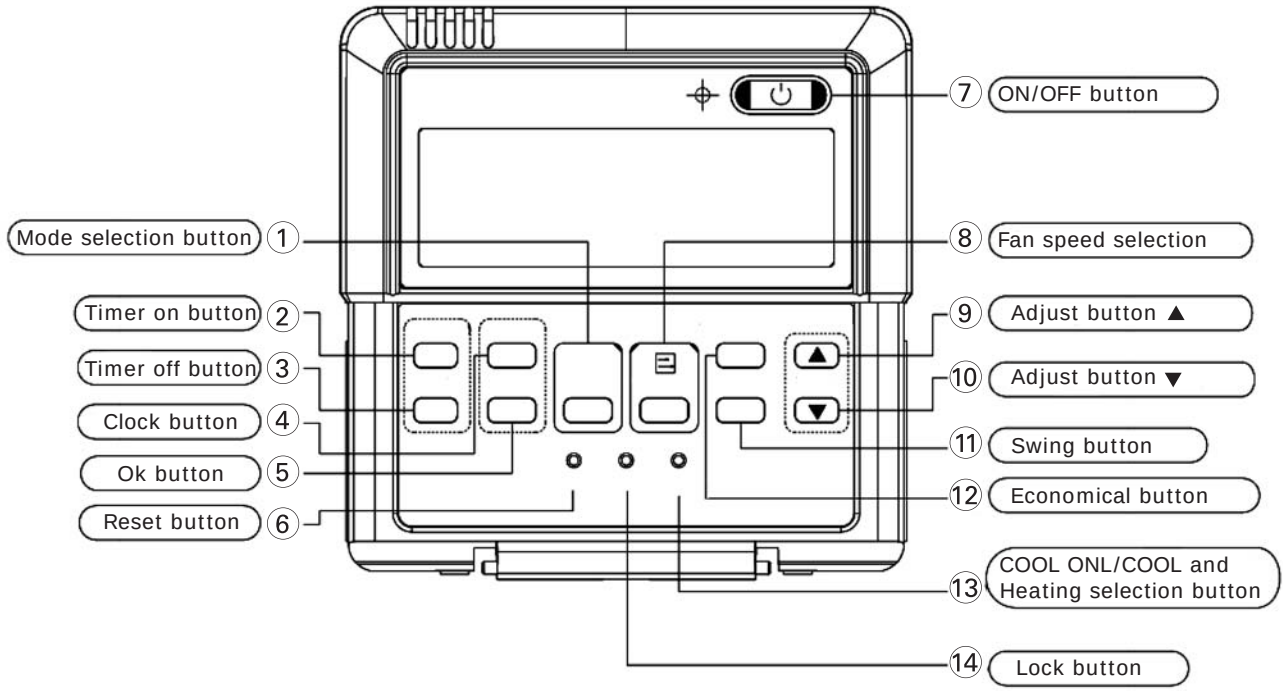


Note:

When the constant frequency is needed for the wired control, please be sure to add a Wire Joint with 5 terminal named A, B, C, D, and E in the indoor units. Then fix an infrared emitter whose anode and cathode are connected with A and B near the receiver in the Indoor Unit Switch Board, and also connected with the terminal +5V, GND. Finally, run in the Switch Board to C, D, E respectively.

Wired controller TMUCW001A

Figure 24



- **Appearance**

Apply to One-way/four way cassette / Concealed type / Convertible type / High wall type.

Button: For some machines with auxiliary electric heater, this button may help with change the machines in to cooling mode only. Factory default setting is cooling and heating mode both exist. Some types do not have this.

- **Installation**

Dimensions: 120×120×15mm

Figure 25

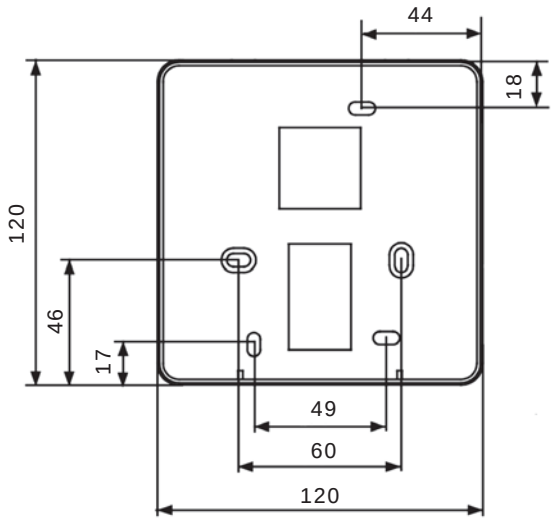
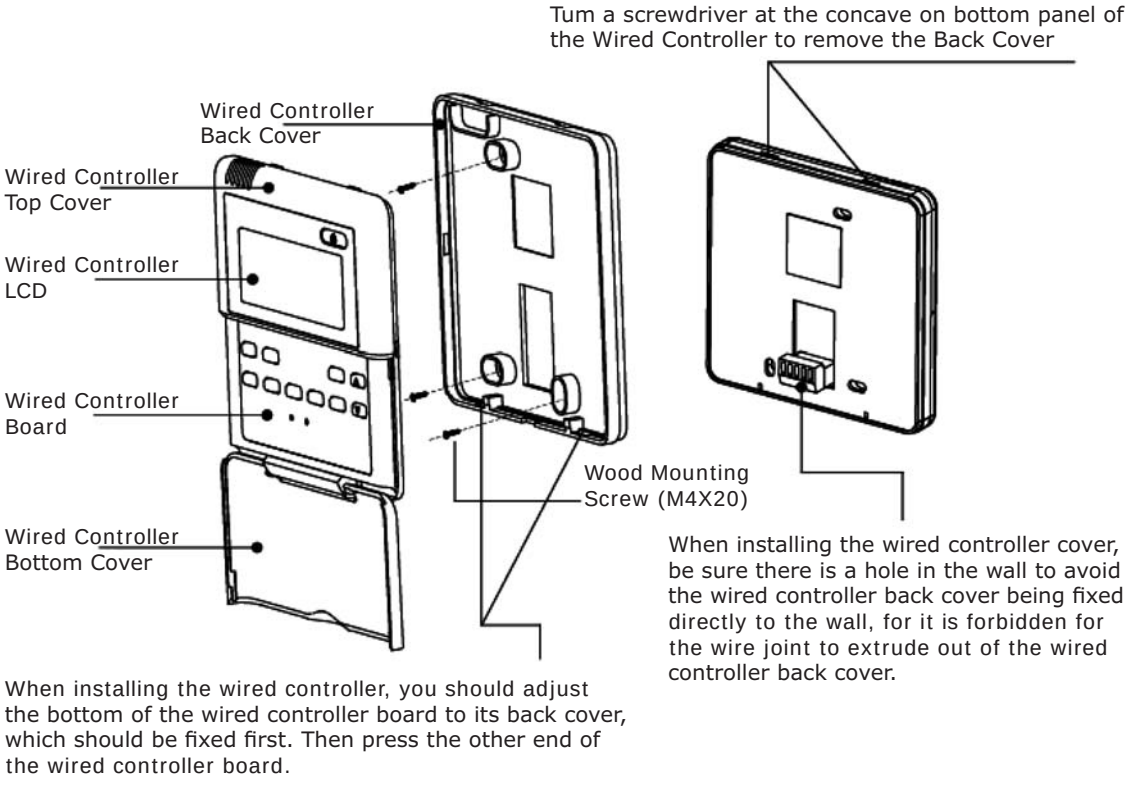


Figure 26


Tum a screwdriver at the concave on bottom panel of the Wired Controller to remove the Back Cover
Wired Controller Back Cover
Wired Controller Top Cover
Wired Controller LCD
Wired Controller Board
Wired Controller Bottom Cover
Wood Mounting Screw (M4X20)
When installing the wired controller cover, be sure there is a hole in the wall to avoid the wired controller back cover being fixed directly to the wall, for it is forbidden for the wire joint to extrude out of the wired controller back cover.
When installing the wired controller, you should adjust the bottom of the wired controller board to its back cover, which should be fixed first. Then press the other end of the wired controller board.

Preparation before Installation:

Make sure the following pasts has been prepared.

Table 29

NO.	Name	QTY.	Remarks
1	Wired Controller	1	With Cover
2	Wood Mounting Screw	3	M4x20 (For mounting on the wall)
3	Mounting Screw	3	M4x25 (For mounting on the electrical switch box)
4	Installation Manual	1	——
5	User Manual	1	——

Prepare for the following on site.

Table 30

NO.	Name	QTY.		Remarks
		Install into the wall	Install on the wall	
1	5-core Shield Cable	1	1	0.05mm^{2}x5 cable, no more than 15m
2	Switch Box	1	——	——
3	Wiring Tube (Insulating Sleeve and Tightening Screw)	1	——	——

Note:

Do not turn screws too tightly, otherwise the cover would be sunk or the Liquid Crystal may be broken.

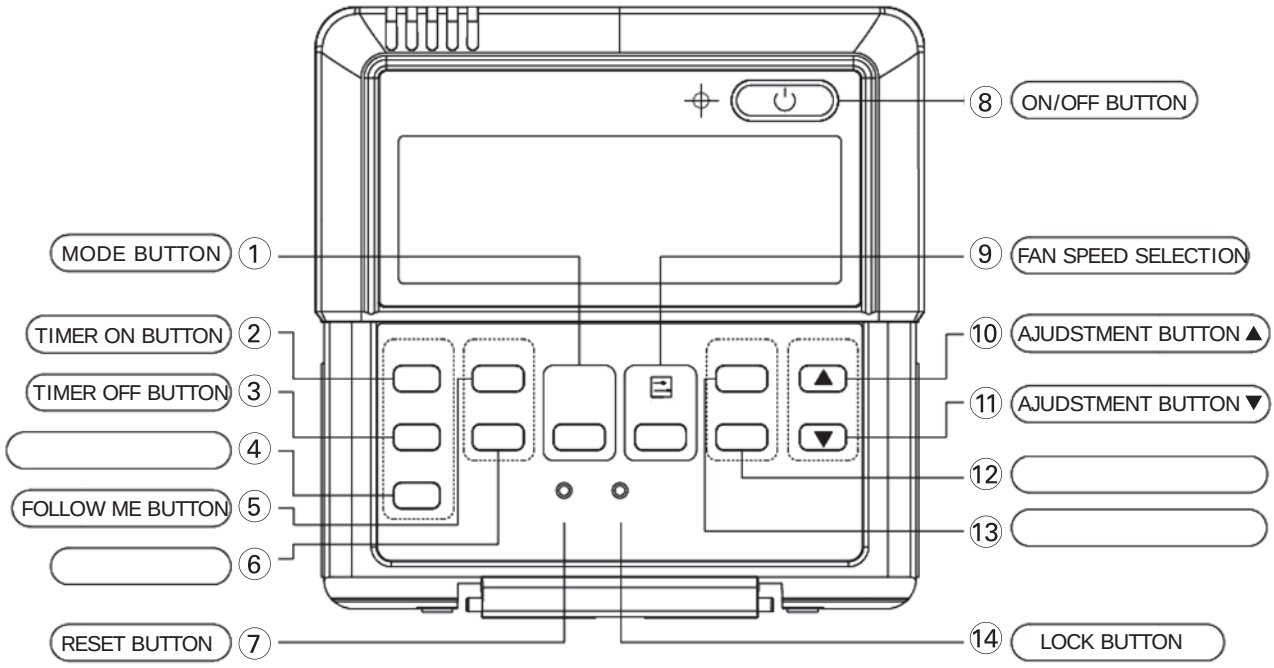
Wired controller TMUCW002A

- **Appearance**

  Apply to the customized indoor unit.

  The same as TMUCW001A with ambient temperature displaying function.

Figure 27



Button ④: The same as TMUCW001A with ambient temperature displaying function.

Button ⑥: There are 2 type of this button.

AUXIL HEATER: Auxiliary electricity heater.

TURBO: This button is used for powerful cooling function in cooling mode. Be noted that it will cause electric auxiliary ineffective in heating mode.

Button ⑫: Pattern ↕ means the vertical swing function and, "SWING" means the normal swing function.

Button ⑬: Pattern ↔ means the horizontal swing function and "ECO" means the economic function.

- **Installation**

  Dimension: 120×120×15mm

Figure 28

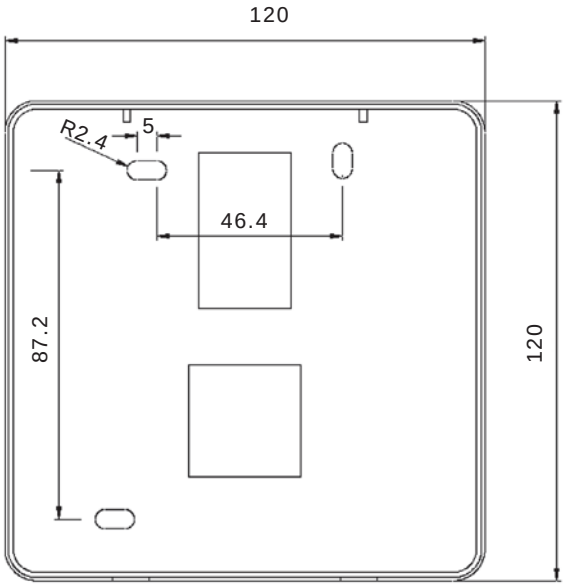
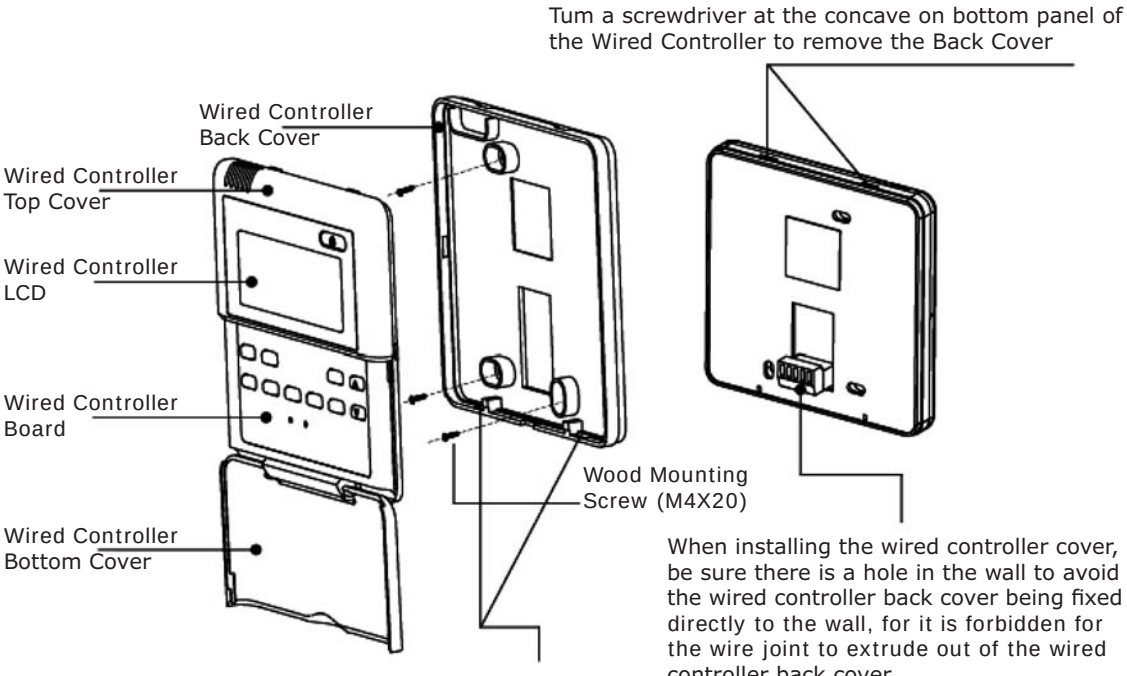


Figure 29


Tum a screwdriver at the concave on bottom panel of the Wired Controller to remove the Back Cover
Wired Controller Back Cover
Wired Controller Top Cover
Wired Controller LCD
Wired Controller Board
Wired Controller Bottom Cover
Wood Mounting Screw (M4X20)
When installing the wired controller cover, be sure there is a hole in the wall to avoid the wired controller back cover being fixed directly to the wall, for it is forbidden for the wire joint to extrude out of the wired controller back cover.
When installing the wired controller, you should adjust the bottom of the wired controller board to its back cover, which should be fixed first. Then press the other end of the wired controller board.

Preparation before Installation:

Make sure the following has been prepared.

Table 31

NO.	Name	QTY.	Remarks
1	Wired Controller	1	With Cover
2	Wood Mounting Screw	3	M4x20 (For mounting on the wall)
3	Mounting Screw	3	M4x25 (For mounting on the electrical switch box)
4	Installation Manual	1	——
5	User Manual	1	——

Prepare for the following on site.

Table 32

NO.	Name	QTY.		Remarks
		Install into the wall	Install on the wall	
1	5-core Shield Cable	1	1	0.05mm^{2}x5 cable, no more than 15m
2	Switch Box	1	——	——
3	Wiring Tube (Insulating Sleeve and Tightening Screw)	1	——	——

Note:

Never turn screws too tightly, otherwise the cover would be sunk or the Liquid Crystal breaks.

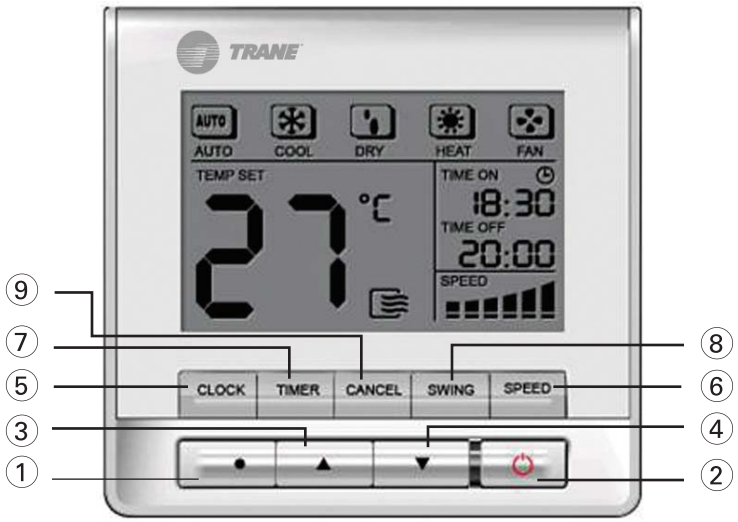
Installation of wired controller TMUCW002A is the same to TMUCW001A.

Wired controller TMUCW003A / TMUCW004A

- **Appearance**

  Button description:

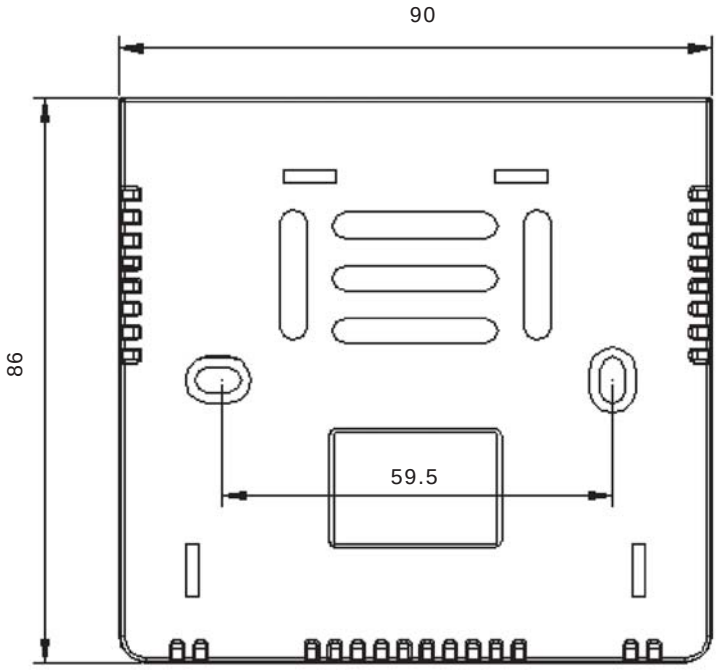
Figure 30



- **Installation**

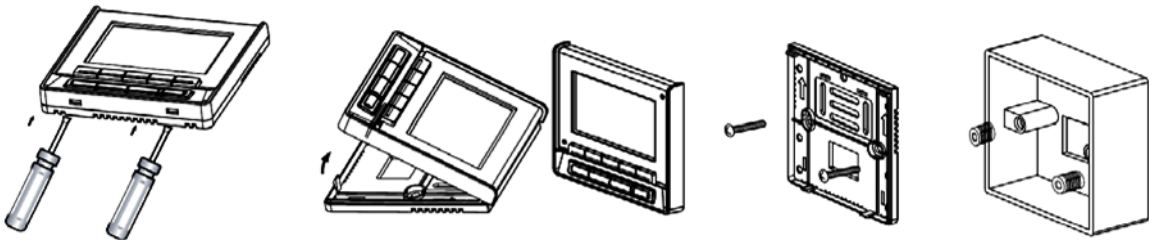
  Dimension: 90×86×13mm

Figure 31



Installation of wired controller:

Figure 32



Preparation before installation:

Make sure the followings have been prepared.

Table 33

NO.	Name	QTY.	Remarks
1	Wired controller	1	——
2	Cruciform slot screw M4x25	2	The accessory is needed when install the wired controller to the electric cabinet.
3	Plastic bolt	2	
4	Installation and User Manual	1	——
5	Connective wires to the signal receive panel	1	Shielded 5-core cable.

Prepare for the following on site.

Table 34

NO.	Name	QTY.	Remarks
1	Electric cabinet	1	Universal electric cabinet's specification. Pre-embed it into wall.
2	Shielded 5-core cable	1	Pre-embed RVVP-0.5mm^{2}x5
3	Wire configured tube (insulate sheath)	1	Pre-embeded in to the wall and the length should be less than 15m
4	Cruciform screwdriver	1	To install cruciform slot screw
5	Slotted head screw	1	To split the bottom from the wired controller

Summary:

Figure 35

Comparison of remote controllers

appearance				
Model	**TMUCW001A**	**TMUCW002A**	**TMUCW003A**	**TMUCW004A**
On / off	•	•	•	•
Auto	•	•	•	——
Cooling	•	•	•	•
Dehumidify	•	•	•	——
Fan	•	•	•	•
Heating	•	•	•	——
On / off Timer	•	•	•	•
Temp.Setting	•	•	•	•
Horizon Swing	•	•	•	•
Vertical Swing	——	——	——	——
Economical mode	•	•	——	——
FOLLOW ME	——	•	——	——
Backlight	——	——	——	——
Powerful cooling	——	——	——	——
Lock mode	•	•	——	——
Cooling / Cooling&Heating Selection	•	——	——	——
Electric Auxiliary Heating ON	——	——	——	——

Centralized Controller

Table 36

Controller	Appearance	Model	Description
Centralized Controller		TMCCW001A	Centralized controller of indoor units. It can control up to 64 indoor units and be able to check the indoor unit individually or all units. It can connect to network control system. It adds mode lock, blue back light display and mode memory function in a big screen appearance.
		TMCCW002A	As the weekly schedule centralized controller of indoor units, it could control up to 64 units maximally and is added with week schedule function. But it could not connect to network control.
		TMCCW003A	As new general controller of indoor units, it is only switch, which cannot set for special mode. However, it could switch max. 16 indoor units simultaneously.
		TOCCW001A	As the centralized controller of outdoor units, it could monitor 32 outdoor units maximally.
		TMCCW004A TMCCW005A	It could control up to 16 indoor units and a water heater.
		TMCCW006A	It could lock up to 64 indoor units to avoid mode conflict.

Centralized controller TMCCW001A

Centralized controller TMCCW001A is a remote wired controller, which could control up to 64 indoor units. Moreover, AC network should be created for this device, including PC central monitoring system and BMS (Building Management System).

Figure 33

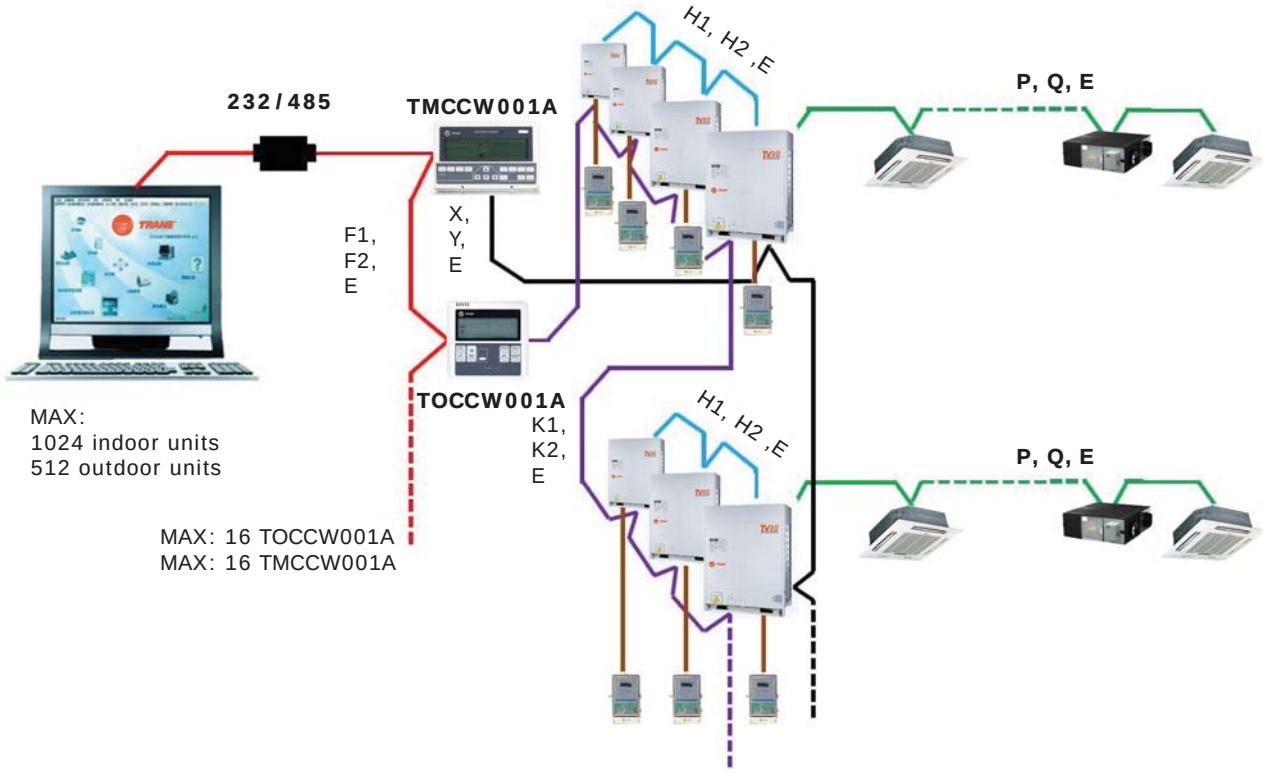
- Memory function: It can record the running parameters (mode/fan speed/temp.). All the units will work as the last setting after operation.
- It will record all the setting information automatically when power off.
- RS485 communication protocol.
- Clear & bright LCD display screen.
- Background light with more parameters display.
- Emergency ON/OFF control with simple dry contact input.

- **System configure**

  With TMCCW001A, we could both centrally control the indoor units and bridge up to 64 indoor units to the PC monitoring software or BMS. It is necessary in connecting the indoor units to the PC or the gateway so as to make the indoor units visible and centrally controlled.

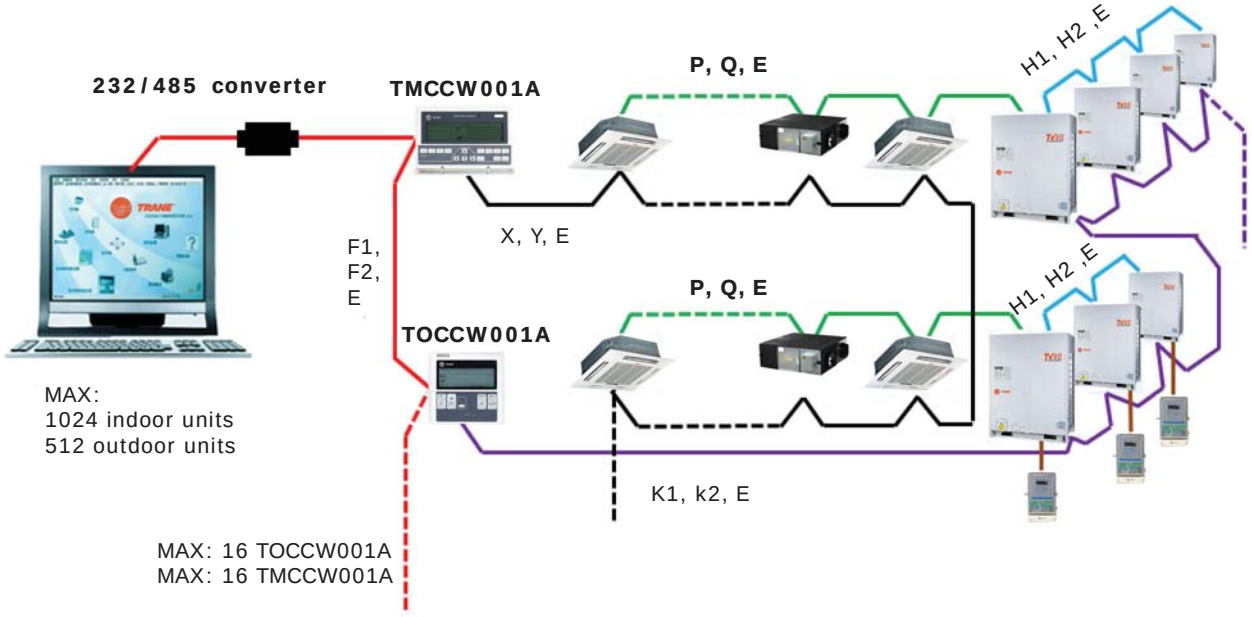
1. All the indoor units and outdoor units are TVR™ II series. The topology of the network is as follows:

Figure 34



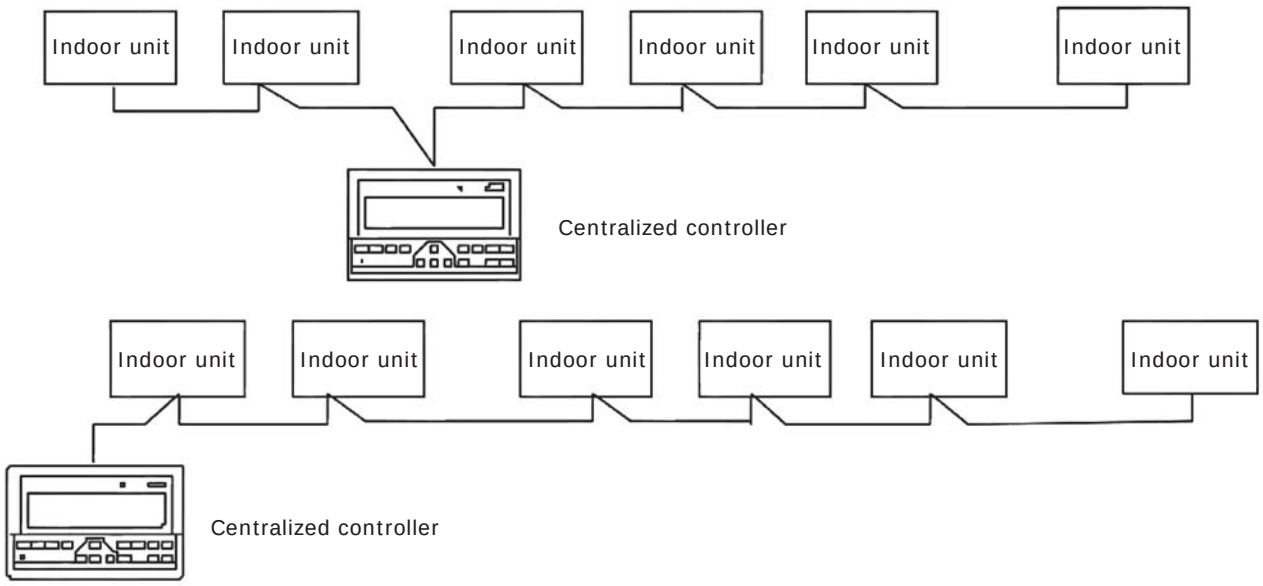
2. The indoor units are TVR™ II series. The network topology is as follows:

Figure 35



For the 2nd type of network topology, either of the connection below is available:

Figure 36



To establish a steady network, the following should be noted

- The signal wire should be 3-core shielded wire and provided by licensed electricians.
- To make signal transmission steady and protect the facilities, the signal transmission wires should not be near to the power line. An interval of 300mm-500mm should exist between these two kinds of wires.
- The signal wire of each network should be less than 1,200m.
- The unit and the centralized controller should be connected hand-in-hand, which means that all the units' same port should be connected to a 3-core wire and the signal wire should be linear in topology. Otherwise, the facilities could not work normally.

- **Description Names and Functions**

  Keywords and general function description

  1. Power on or reset

     When the centralized controller is powered on or reset, all display segments of the LCD are luminous for 2 seconds and then goes off. 1 second later, the system enters the normal display status. The centralized controller is in the main page display status and displays the first page, and searches the in-service air conditioners in the network. Once the search is finished, the centralized controller enters the mode setting page, and sets the first in-service air conditioner by default.

  2. Network area address of centralized controller

     The local computer or gateway can be connected with 16 centralized controllers for communication.

     Each centralized controller serves as an area of the air conditioner network. The centralized controllers are differentiated by bit selection address. The configurable range is 0~15.

  3. State indications

     If any local keypad operation is setting the operation status of the air conditioner, the indicator is on when the signals are sent. Upon completion of the setting process, the indicator goes off. If an in-service air conditioner in the network is faulty, or the centralized controller network itself is faulty, the indicator will blink at 2Hz.

     If one or more in-service air conditioners in the network are running, including under setting of timing start/shutdown, the indicator will be luminous. Otherwise, the indicator is off.

  4. Locking of centralized controller

     After receiving the centralized controller locking command sent from the computer, the centralized controller disables the startup/shutdown and setting of the air conditioner, and sends commands to lock remote controllers of all air conditioners in the network of the centralized controller. After receiving the unlocking command, the centralized controller enables the startup/shutdown operation, and sends commands to unlock the remote controller of all air conditioners.

     The locking status of the remote controller can be locked or unlocked by the computer or centralized controller separately. The locking status of the centralized controller is memorized after power failure of the centralized controller, and will not vanish after the power supply is restored, unless the command of unlocking is received.

5. Mode locking function

   After the mode locking command is received, the command is forwarded to the air conditioner, and the centralized controller displays the mode locking flag. After the command of unlocking is received, the non-conflict mode can be selected freely. The centralized controller can also lock modes of all indoor units.

6. Emergent shutdown and compulsory startup

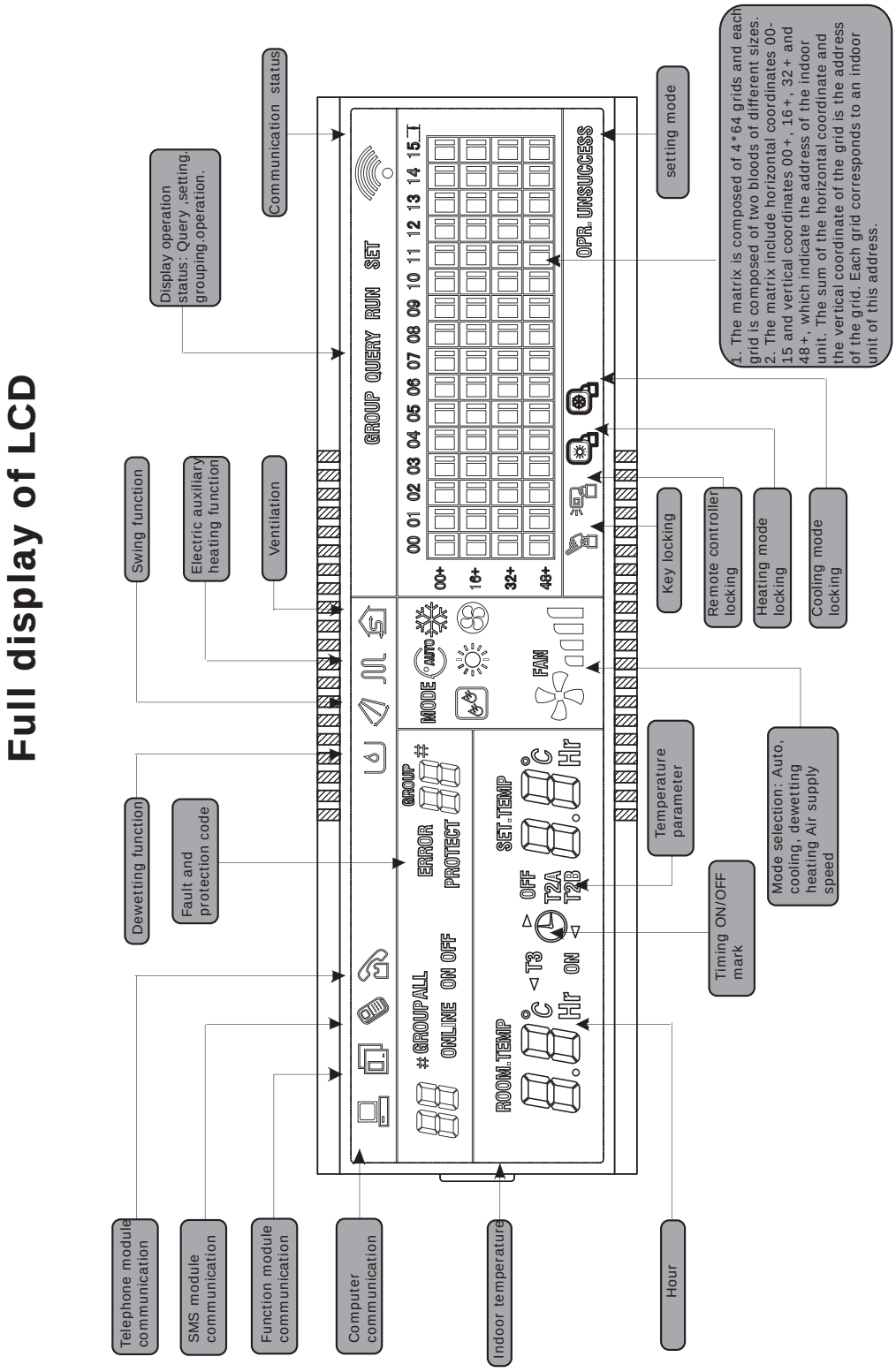
   When the emergent shutdown switch of the centralized controller is shorted, all air conditioners in the network of the centralized controller will shut down compulsorily. The centralized controller and computer and all functional modules are disabled from startup and shutdown until the foregoing switch is open.

   When the compulsory startup switch of the centralized controller is shorted, all air conditioners in the network of the centralized controller will start up compulsorily. In default conditions, they will run in the cooling mode. The startup and shutdown operations of the centralized controller and the computer and all functional modules will be disabled (only the command of startup is sent to the air conditioner, without affecting operation of the remote controller after startup) until the foregoing switch is opened.

   If the foregoing two switches are shorted in the same time, the emergent shutdown switch shall have preference.

Liquid Crystal Display:

Figure 37


Full display of LCD
GROUP QUERY RUN SET
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
00+ 16+ 32+ 48+
OPR. UNSUCCESS
MODE AUTO
FAN
GROUP #
ERROR
PROTECT
SET.TEMP °C Hr
GROUP ALL
ONLINE ON OFF
ROOM.TEMP °C Hr
T3 ON
OFF T2A T2B
Communication status
Display operation status: Query .setting. grouping.operation.
setting mode
1. The matrix is composed of 4*64 grids and each grid is composed of two bloods of different sizes. 2. The matrix include horizontal coordinates 00-15 and vertical coordinates 00+, 16+, 32+ and 48+, which indicate the address of the indoor unit. The sum of the horizontal coordinate and the vertical coordinate of the grid is the address of the grid. Each grid corresponds to an indoor unit of this address.
Swing function
Electric auxiliary heating function
Ventilation
Key locking
Remote controller locking
Heating mode locking
Cooling mode locking
Dewetting function
Fault and protection code
Temperature parameter
Mode selection: Auto, cooling, dewetting heating Air supply speed
Timing ON/OFF mark
Telephone module communication
SMS module communication
Function module communication
Computer communication
Indoor temperature
Hour

Note:

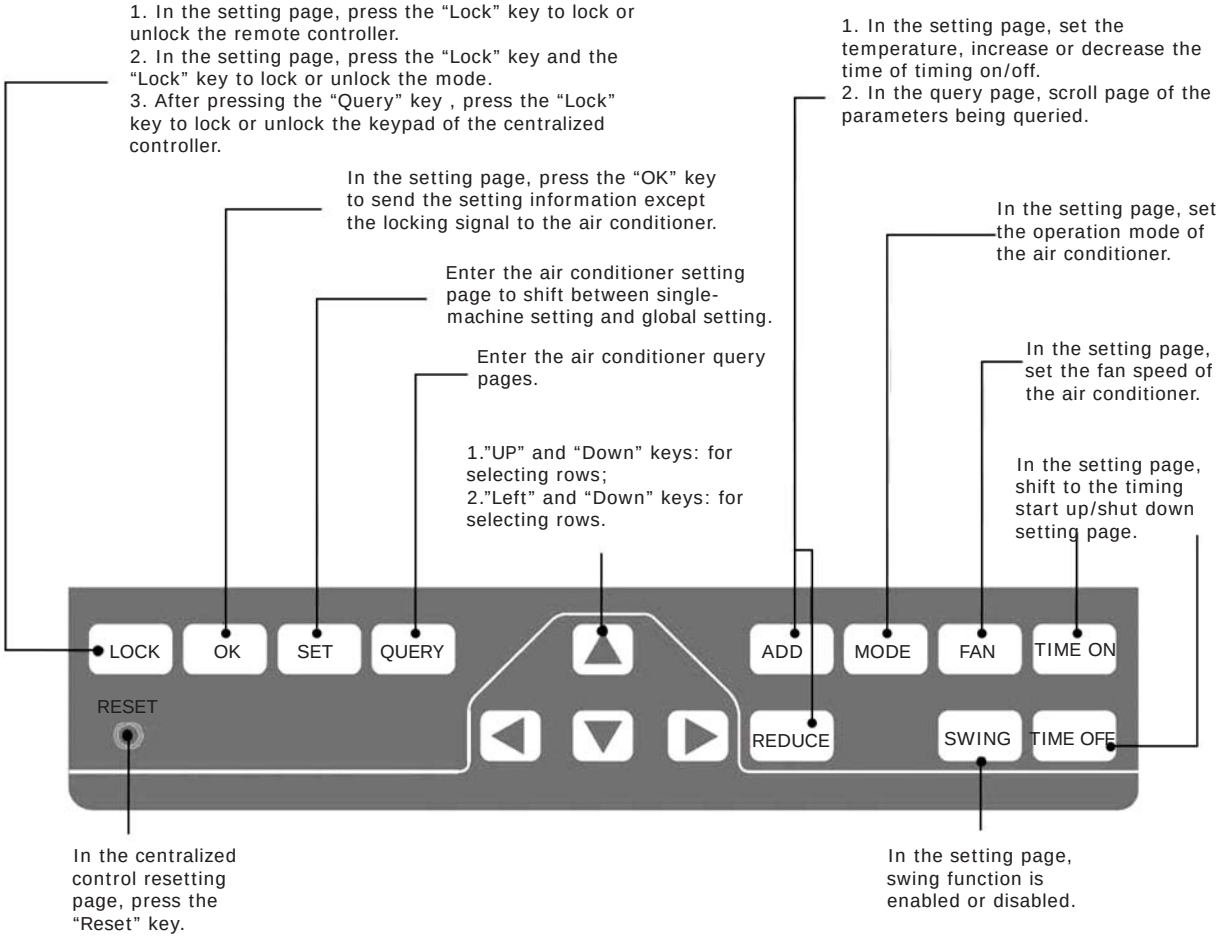
Each grid composes two blocks, whose sizes are different and thus indicate different status. Indications are as follows:

Table 37

status / Object	Constantly on	Slow blink	Fast blink	Disappeared
Big block	Unit is in service	Selected		Out of service
Small block	Power is on		Unit malfunction	Power is off

Buttons and Functions

Figure 38


1. In the setting page, press the “Lock” key to lock or unlock the remote controller.
2. In the setting page, press the “Lock” key and the “Lock” key to lock or unlock the mode.
3. After pressing the “Query” key , press the “Lock” key to lock or unlock the keypad of the centralized controller.
In the setting page, press the “OK” key to send the setting information except the locking signal to the air conditioner.
Enter the air conditioner setting page to shift between single-machine setting and global setting.
Enter the air conditioner query pages.
1.”UP” and “Down” keys: for selecting rows;
2.”Left” and “Down” keys: for selecting rows.
1. In the setting page, set the temperature, increase or decrease the time of timing on/off.
2. In the query page, scroll page of the parameters being queried.
In the setting page, set the operation mode of the air conditioner.
In the setting page, set the fan speed of the air conditioner.
In the setting page, shift to the timing start up/shut down setting page.
LOCK
OK
SET
QUERY
ADD
MODE
FAN
TIME ON
RESET
REDUCE
SWING
TIME OFF
In the centralized control resetting page, press the “Reset” key.
In the setting page, swing function is enabled or disabled.

Buttons and Functions

1. Query key

   Any time when you press the key, the selected operation mode is to query the operation status of the air conditioner. By default, the first in-service air conditioner will be queried. Through the Increase and Decrease keys, you can change the parameter page to be queried; through the Up, Down, Left and Right keys, you can change to query status of other in-service air conditioners.

2. Set key

   In other display mode, press the key to enter the setting mode. By default, it is single setting, and the first in-service air conditioner is displayed. In setting operation mode, press the key again, and the operation will be performed for all air conditioners in the network. Press the key repeatedly to shift between single setting and global setting.

   →Single→Global→

3. Mode key

   In setting operation mode, press this key to set the operation.

   →cooling→heating→supply air only→stop→

   In other display mode, press the key to enter the setting mode. By default, it is single-machine setting, and the first in-service air conditioner is displayed.

4. Fan key

   In setting operation mode, press this key to set the fan of the indoor unit of the air conditioner to run in the automatic, high, medium or low level of air.

   →auto→low→medium→high→

5. Time on key

   In setting operation mode, press this key to set the timing startup of air conditioner; press the key again to exit the timing setting, and restore the normal temperature regulation operation mode.

   →time on→set temperature regulation→

6. Time off key

   In setting operation mode, press this key to set the timing shutdown of air conditioner; press the key again to exit the timing setting, and restore the normal temperature regulation operation mode.

   →time on→set temperature regulation→

7. Swing

   In setting operation mode, press this key to enable or disable the swing function. No effect will result for the units without this function.

8. Leftward key

   In the query mode, every time when you press the key, the operation status data of the previous air conditioner will be displayed. If it is currently on the first machine, press the key again, and the data of the last machine will be displayed. If you hold down this key, the address will decrease one by one.

   In the setting mode, every time when you press the key, if it is in single operation mode, the air conditioner of the previous in-service address number will be selected. If it is in the global operation mode, no effect will result after the key is pressed.

   In the main page, press the key to enter the query mode. By default, it is the first air conditioner in-service.

9. Rightward key

   In the query mode, every time when you press the key, the operation status data of the last air conditioner will be displayed. If it is currently on the last machine, press the key, and the data of the first machine will be displayed. If you hold down this key, the address will increase one by one.

   In the setting mode, every time when you press the key, if it is in the single operation mode, the air conditioner of the next in-service address number will be selected. If it is in the global operation mode, no effect will result after the key is pressed.

   In the main page, press the key to enter the query mode. By default, it is the first in-service air conditioner.

10. Downward key

    In the query mode, every time when you press the key, the operation status data of the air conditioner corresponding to the next row of the matrix will be displayed. If it is currently in the last row, press the key, and the data of the air conditioner corresponding to the first row will be displayed. If you hold down this key, the row will increase one by one.

    In the setting mode, every time when you press the key, if it is in the single operation mode, the air conditioner corresponding to the last row will be selected. If it is in the global operation mode, no effect will result after the key is pressed.

    In the main page, press the key to enter the query mode. By default,it is the first in-service air conditioner.

11. Upward key

    In the query mode, every time when you press the key, the operation status data of the air conditioner corresponding to the previous row of the matrix will be displayed. If it is currently in the first row, press the key, and the data of the air conditioner corresponding to the last row will be displayed. If you hold down this key, the row will decrease one by one. In the setting mode, every time when you press the key, if it is in the single operation mode, the air conditioner corresponding to the previous row will be selected.

    If it is in the global operation mode, no effect will result after the key is pressed.

    In the main page, press the key to enter the query mode. By default, it is the first in-service air conditioner.

12. Add key

    In the main page or the query mode, every time when you press the key, the data of the last page will be displayed. If it is now in the last page, press the key again, and the first page will be displayed.

    In the setting mode, every time when you press the key, if it is in the temperature regulation mode, the set temperature will decrease by 1°C until the highest allowed set temperature; if it is in the timing startup/shutdown time setting mode, select the upper-level set time, if no time is set, 0.0 will be displayed, if you hold down the key, the upper-level data will be selected consecutively.

    The specific change mode is as follows:

    0.0→0.5→1.0→1.5→2.0→2.5→3.0→3.5→4.0→4.5→5.0→5.5→6.0→6.5→7.0→7.5→8.0→8.5→9.0→9.5→10→11→12→13→14→15→16→17→18→19→20→21→22→23→24

13. Reduce key

    In the main page or the query mode, every time when you press this key, the data of the current page will be displayed. If it is now in the first page, press the key again, and the last page will be displayed.

    In the setting mode, every time when you press the key, if it is in the temperature regulation mode, the set temperature will decrease by 1 degree until the lowest allowed set temperature; if it is in the timing startup/shutdown time setting mode, select the upper-level set time, if no time is set, 0.0 will be displayed, if you hold down the key, the upper-level data will be selected consecutively.

    The specific change mode is as follows:

    0.0←.5←1.0←1.5←2.0←2.5←3.0←3.5←4.0←4.5←5.0←5.5←6.0←6.5←7.0←7.5←8.0←8.5←9.0←9.5←10←11←12←13←14←15←16←17←18←19←20←21←22←23←24

14. ON/OFF key

    Any time when you press the key, the centralized startup/shutdown operation is performed for all current in-service air conditioners in the centralized controller network. If all in-service air conditioners in the network are in the power-off status, press the key to perform the startup operation.

    If it is in the mode setting page currently, and the parameters such as startup mode, temperature and air speed are selected, the air conditioner will be started according to the selected parameters.

    If no mode is selected currently, and the air conditioner is powered off or it is in other display page currently, and the default startup mode is: Cooling,strong air, set temperature 24°C, swing function enabled. The default startup mode is locked according to the system mode or judged according to other constraint conditions. If any conflict exists, the next conflict-free mode will apply automatically. If conflict exists for all modes, startup will be impossible. If one or more in-service air conditioners in the network (including in the timing process of timing startup/shutdown), pressing this key will shut down all air conditioners. When performing the shutdown operation, the shutdown command is issued to the air conditioners in the startup status only, and is not issued to those in the shutdown status.

15. Lock key

    In the mode setting mode, press the Lock key, and the remote controller of the currently selected air conditioner will be locked/unlocked. The operation mode is: If you select single-machine setting, the operation is performed for the air conditioner of the current address only. If the remote controller of the air conditioner is locked currently, issue the lock command; otherwise, send the lock command. If you does not select the single-machine mode, and the remote controller of one or more currently selected air conditioners is locked, issue the unlock command; if the remote controllers of all currently selected air conditioners are in the non-locked status, issue the remote controller lock command. When the remote controller of the air conditioner is locked, the air conditioner does not receive remote control signals from the remote controller or wire controller until the remote controller is unlocked. Press the Query key and then press the Lock key, and the keys of the centralized controller will be locked or unlocked. If the keys are currently locked, press the foregoing keys concurrently again, and the keys will be unlocked; if the keys are currently unlocked, press the foregoing keys concurrently, and the keys will be locked. If the keys are locked, pressing of any key other than the Unlock key will be ineffective.

    In the unified setting page, press the Up key and the Lock key concurrently to lock all air conditioner mode in the network. The mode locking is cancelled when the key is pressed again.

Note:

When you lock or cancel locking, the corresponding icon indication appears or disappears only after all the air conditioners in-service are set completely, as a result, it take a while to finish the mission. Please wait patiently when there are many air conditioners in-service.

16. Confirmation key

    In the setting mode ,press the key to send the currently selected mode status and the auxiliary function status to the selected air conditioner, and display the mode setting operation results.

    After you select the operation mode and auxiliary function status information of the air conditioner, if you do not press the confirmation key, the selected information will not be sent to the air conditioner, and thus will not affect the current operation of the air conditioner.

    When locking or unlocking the remote controller, it si not necessary to press the confirmation key.

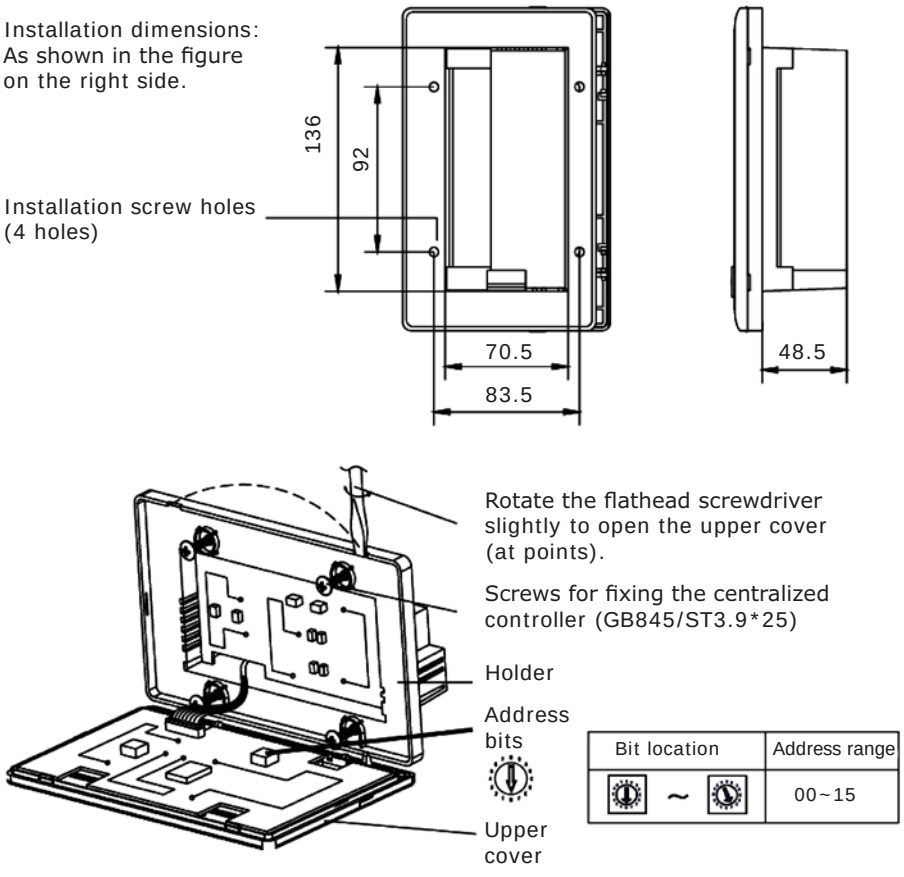
    The command information is sent directly after the locking key is pressed.

17. Reset key

    Anytime when the reset key is pressed, the centralized controller will reset. The result is the same as the result of restoring power after power failure.

- **Installation**

Figure 39



Note:

To differentiate each centralized controller, the controllers in the same RS485 net should be with different address with each other.

Figure 40

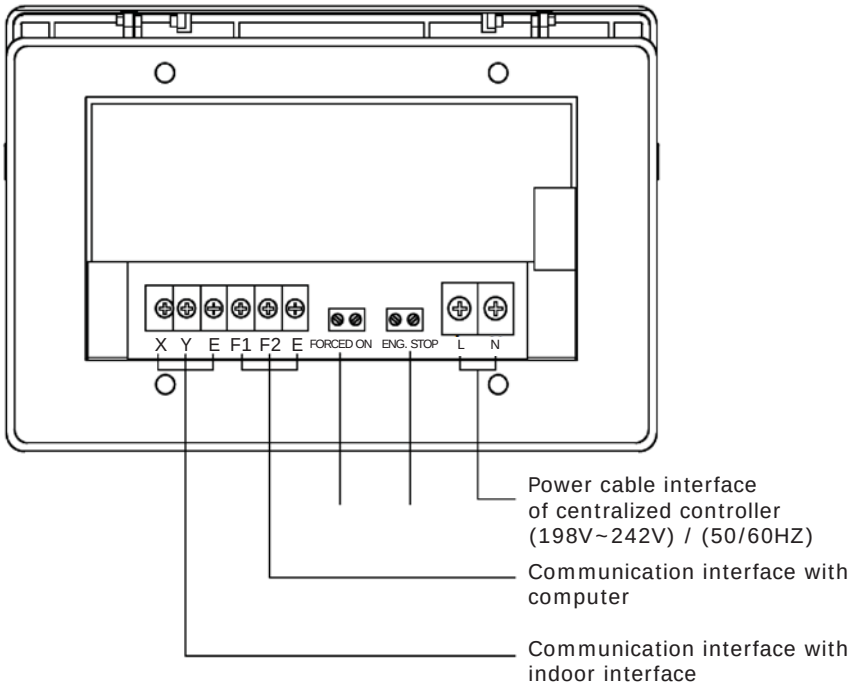
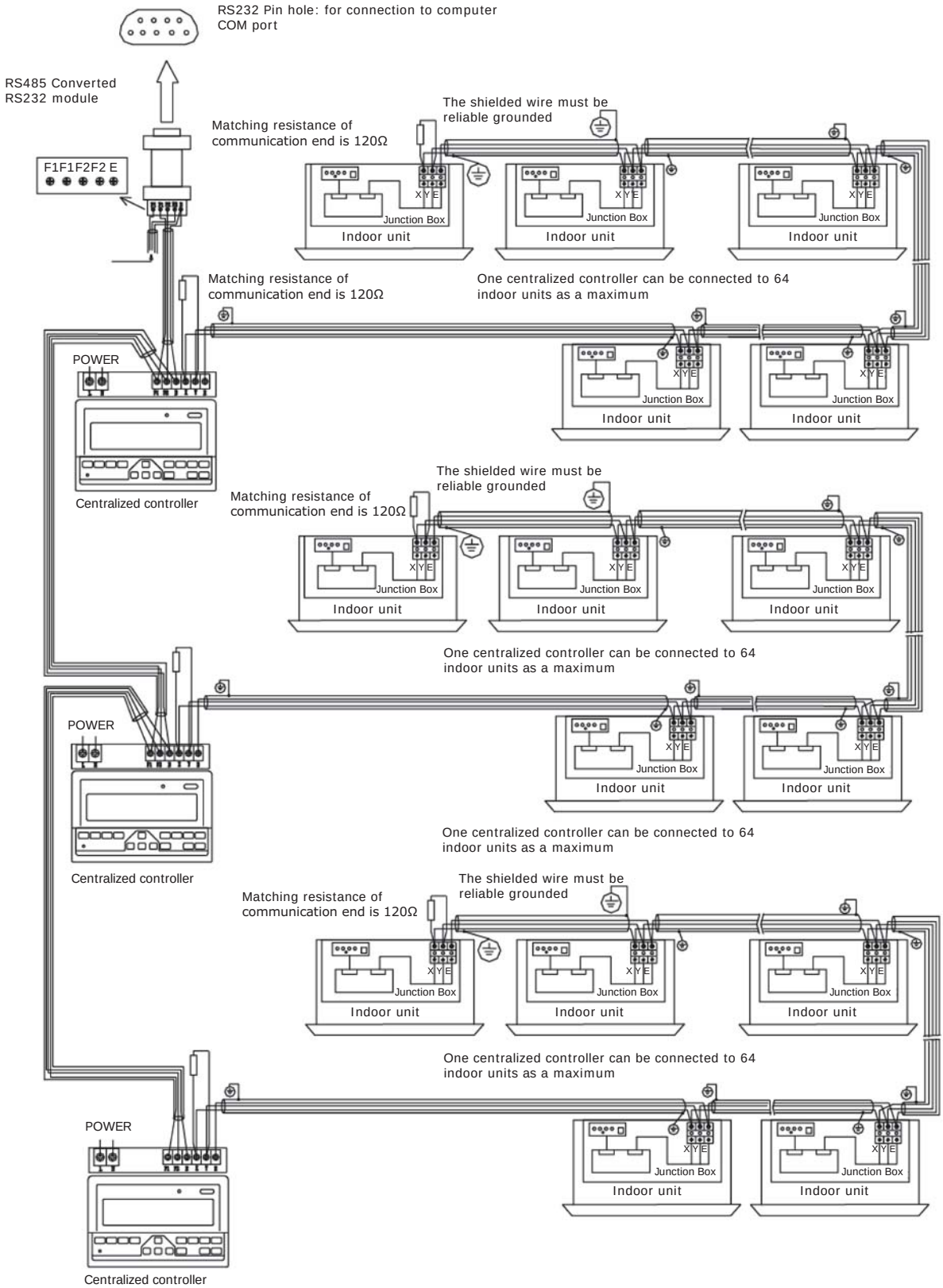

X Y E F1 F2 E
FORCED ON
ENG. STOP
L N
Power cable interface of centralized controller (198V~242V) / (50/60HZ)
Communication interface with computer
Communication interface with indoor interface

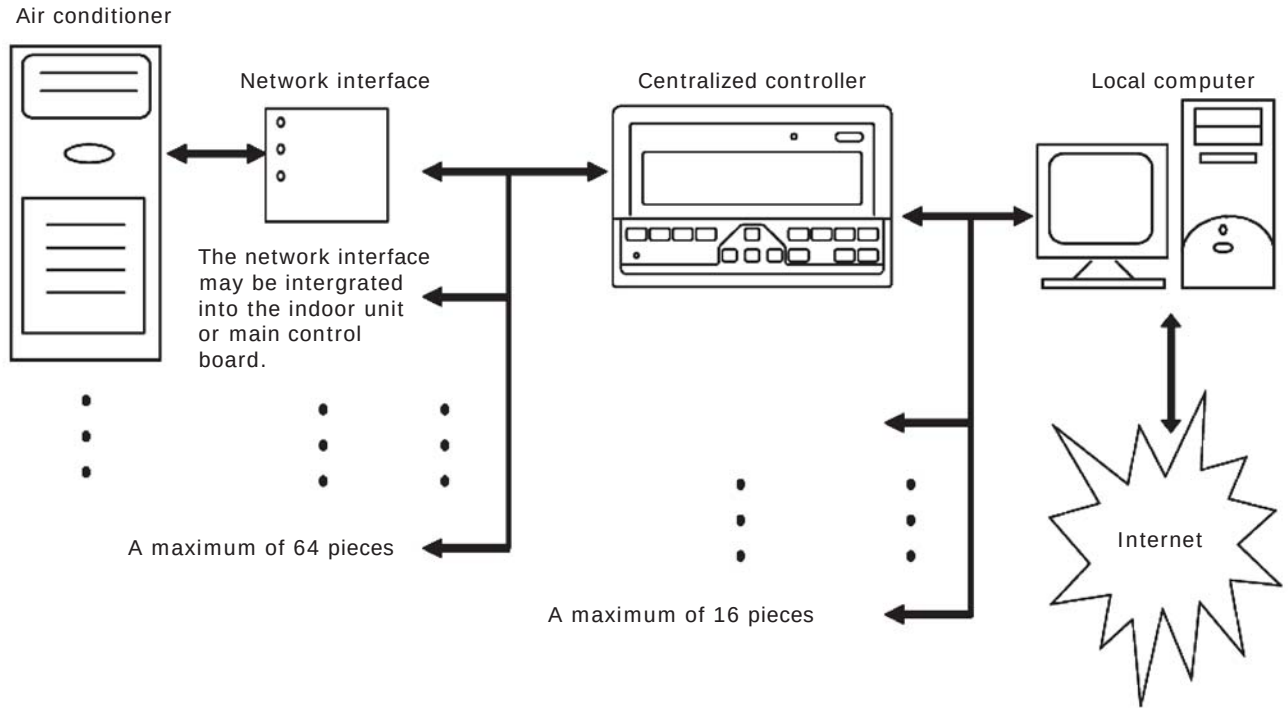
Figure 41


RS232 Pin hole: for connection to computer COM port
RS485 Converted RS232 module
F1F1F2F2 E
Matching resistance of communication end is 120Ω
The shielded wire must be reliable grounded
Junction Box
Indoor unit
One centralized controller can be connected to 64 indoor units as a maximum
POWER
Centralized controller

Note:

The module, which is RS485 shift to RS232 in the diagram and the connective cable are only used when the net system connect with computer. One computer can connect with 16 centralized controllers, namely 16X64=1,024 indoor units could be controlled at most. The centralized controller to be distinguished by dial code address, the address setting range is from 0 to 15, thus in a network system without two centralized controller could be set in a same address.

Figure 42

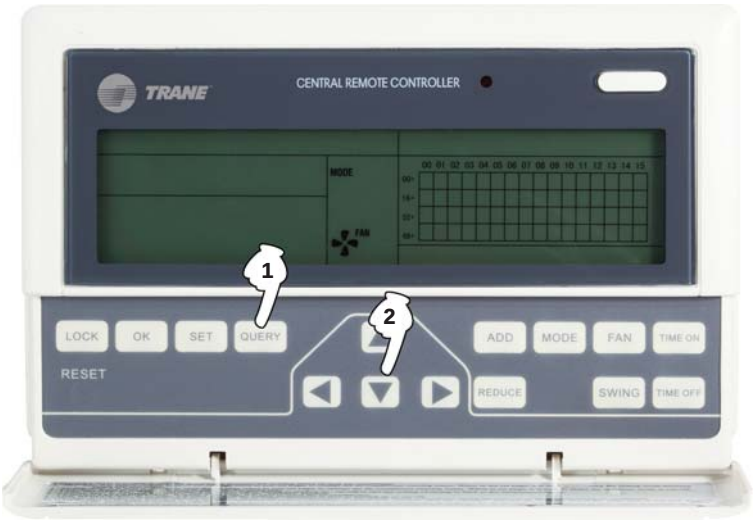

Air conditioner
Network interface
Centralized controller
Local computer
The network interface may be intergrated into the indoor unit or main control board.
A maximum of 64 pieces
A maximum of 16 pieces
Internet

Before starting the net work, please confirm that every TMCCW001A address is different with each other.

- **Query and Error code**

  The TMCCW001A centralized controller offers the function of query of indoor units running state and displays the error code when some of the indoor units fail down.

Figure 43



1. Press the query button to activate the query function. The display panel will display the 1st units' state.
2. Use the UP, DOWN, LEFT, RIGHT buttons to select the unit for query.

The indication of error codes are as the following table shows:

Table 38

Fault code	Content
EF	Other faults
EE	Water level detection faults
ED	Outdoor unit fault
EC	Cleaning fault
EB	Inverter module protection
EA	Current of compressor is too large (4 Times)
E9	Fault of communication between main board and display board
E8	Wind blowing speed is out of control
E7	EEPROM error
E6	Detection of current direction alternating is abnormal

E5	T3 or T4 temp.senor of discharge of compressor fails down
E4	T2B sensor fails to work normally
E3	T2A sensor fails to work normally
E2	T1 sensor fails to work normally
E1	Communication fault
E0	Phase sequence disorder or loss of power phase
07#	
06#	
05#	
04#	
03#	Communication mistake between centralized controller and PC (gateway)
02#	Communication mistake between centralized controller and functional module
01#	Communication mistake between centralized controller and network interface module
00#	Communication mistake between network interface module and main control board

Table 39

Protection code	Content
PF	Other protection
PE	Reserved
PD	Reserved
PC	Reserved
PB	Reserved
PA	Reserved
P9	Reserved
P8	Compressor's current is too large
P7	Voltage of power supply is too high or too low
P6	Pressure of discharge is too low
P5	Pressure of discharge is too high
P4	Temp.of discharge pipe is abnormal
P3	Temp.of compressor is abnormal
P2	Condenser high-temperature protection
P1	Anti cool air or defrost protection
P0	Evaporator temperature protection

Weekly schedule timer centralized controller TMCCW002A

On the basis of TMCCW001A, TMCCW002A could control 64 indoor units maximally with weekly schedule timer function. However, it can't be connected to the network control system nor have the port F1, F2 and E, which are used to connect to the computer.

Figure 44

- 7-day Weekly schedule setting (Maximum 128 weekly&daily schedules)
- Max.64 indoor units group control or individual setting
- Clear and bright screen with LCD backlight
- Temperature setting
- Wireless remote control restriction
- Sleep and Silent mode
- Mode lock
- Permanent schedule setting storage

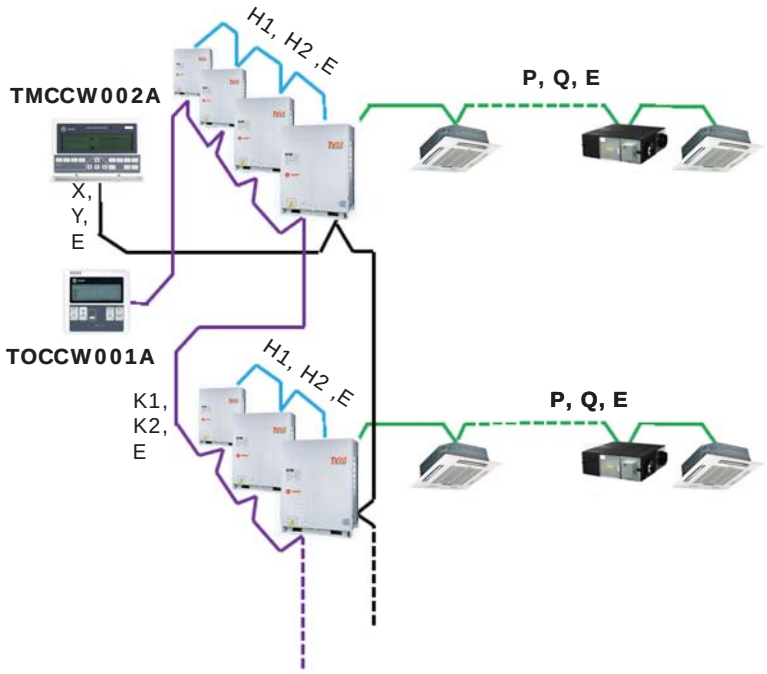
- **System configure**

  TMCCW002A is only a indoor units centralized controller, but with this device we could set the indoor unit' s functions compactly and conveniently.

  1. All the indoor units and outdoor units are TVR™ II series. The topology of the network can be as follows.

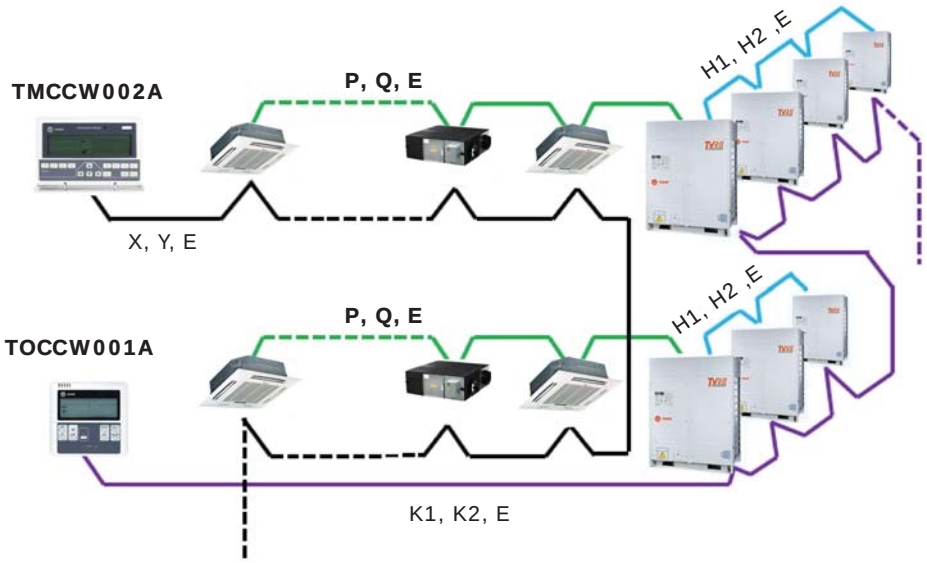
     Moreover the 2nd way of connecting is also adaptable in this condition.

Figure 45



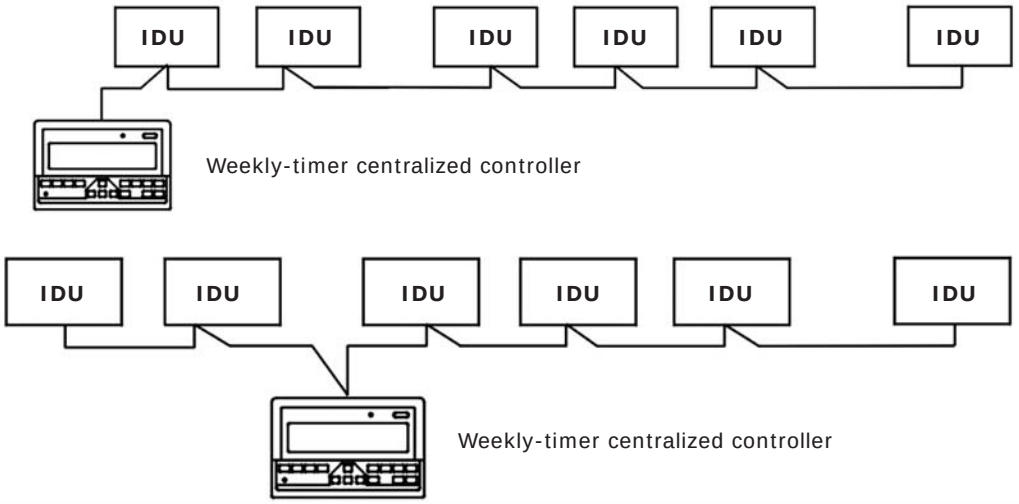
2. The indoor units are TVR™ II series. The network topology is as follows.

Figure 46



TMCCW002A controller needs to be connected with other indoor units in a hand-in-hand way, which is the same connecting way with TMCCW001A. For the 2nd type of topology, either of the connecting ways below is available.

Figure 47


IDU
IDU
IDU
IDU
IDU
IDU
Weekly-timer centralized controller
IDU
IDU
IDU
IDU
IDU
IDU
Weekly-timer centralized controller

- **Description Names and Functions**

Figure 48

Full display of LCD

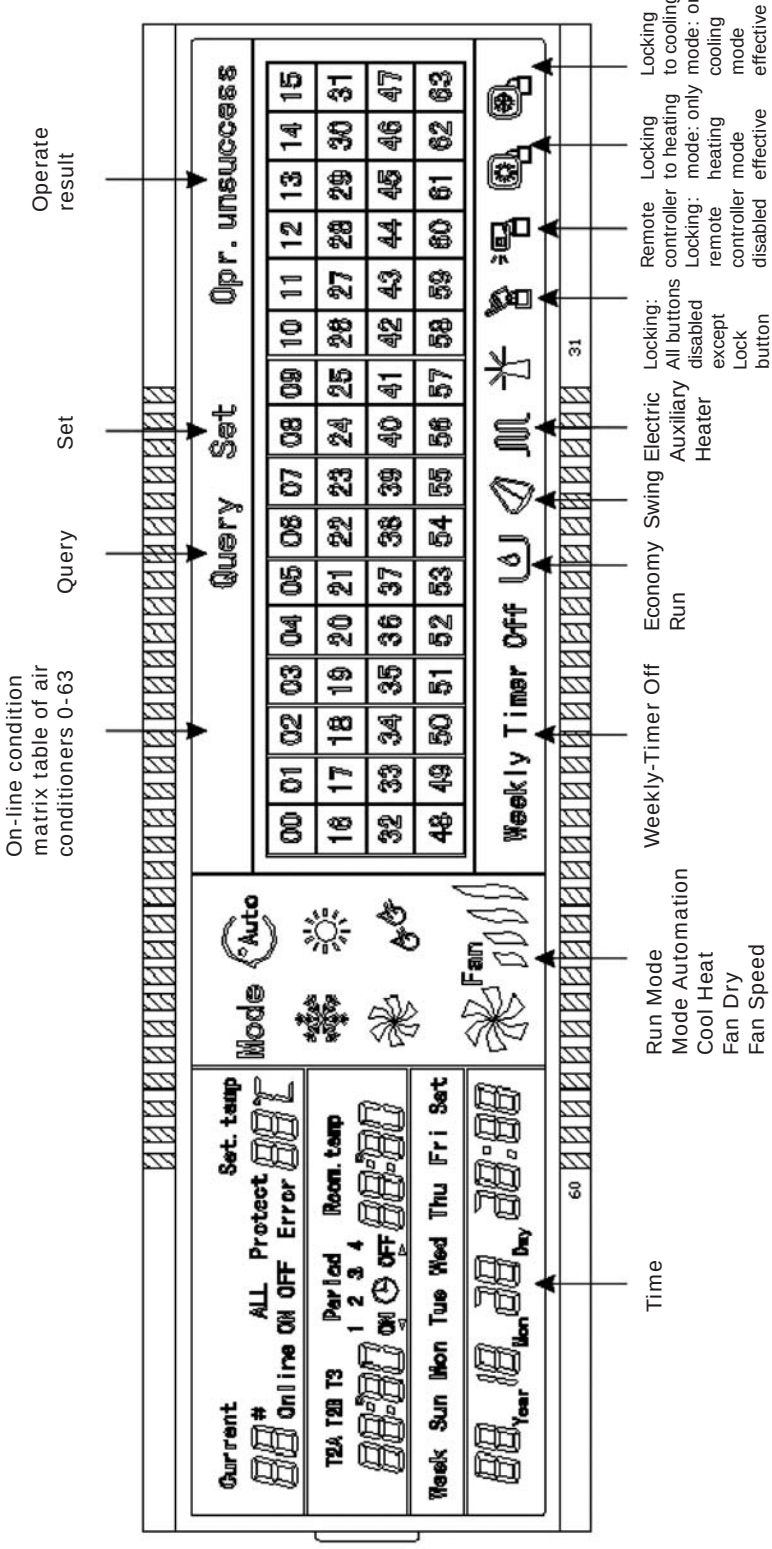
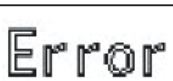
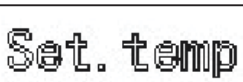
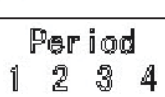
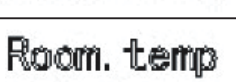
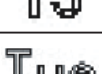
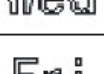
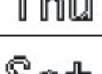
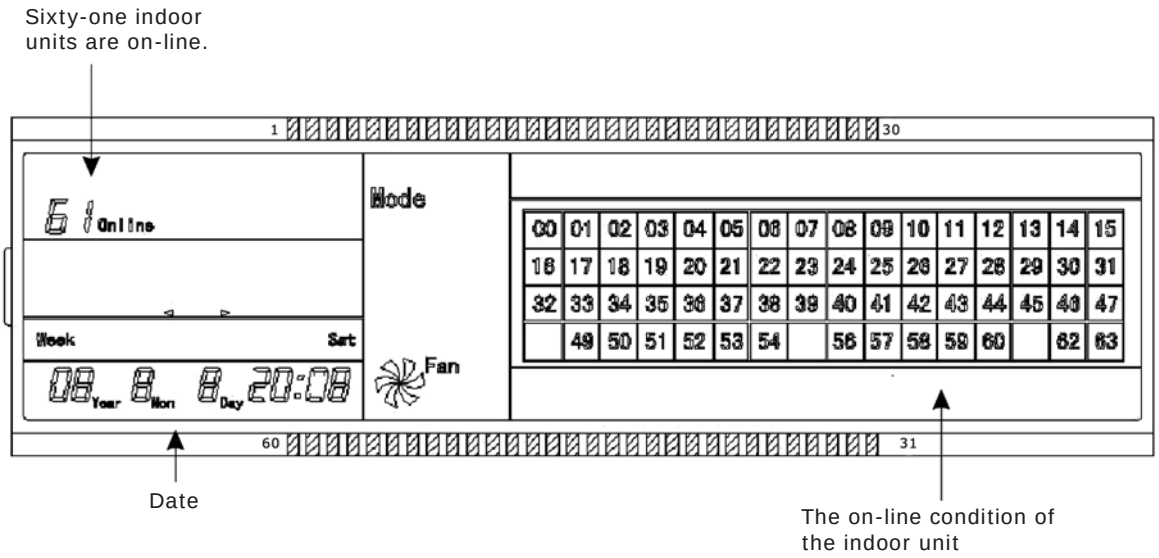


Table 40

Icon	Meaning	Icon	Meaning
	Auto mode		Fan only mode
	Cooling mode		Dry mode
	Heating mode		Fan speed
	Electric auxiliary heating		Heating mode only
	Cooling mode only		Wireless controller lock
	Lock keyboard		Set mode
	Query mode		Operating result
	Weekly timer off		All units are selected
	Online status		Protection code follows
	Error code follows		Set temperature
	Corresponding period		Room temperature
	Temp. of the middle of evaporator		Temp. of the outlet of the condenser
	Temp. Of outdoor pipe		Monday
	Tuesday		Wednesday
	Thursday		Friday
	Saturday		Sunday

Display panel indications

Figure 49



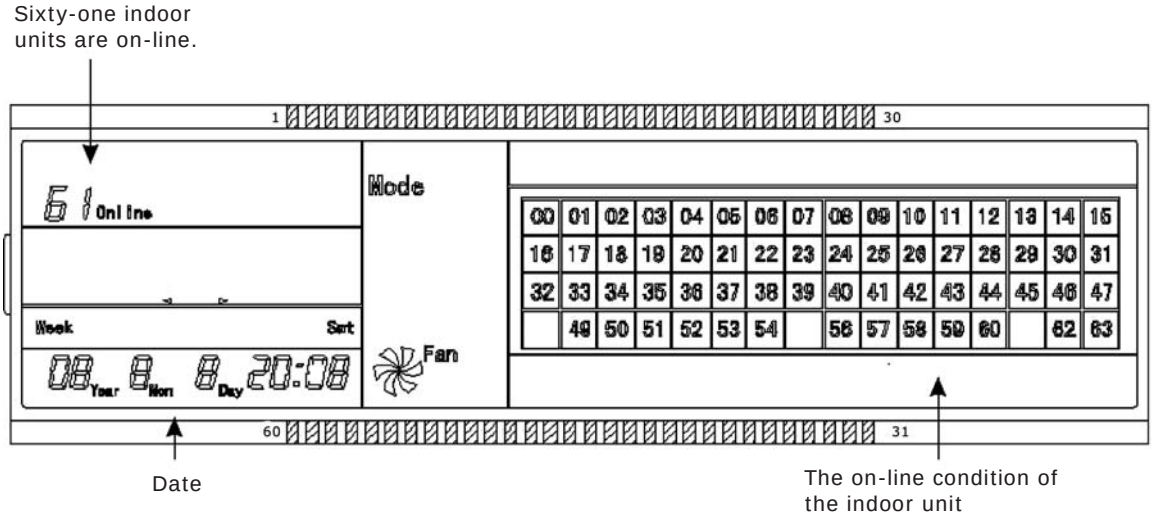
1. The main interface of the weekly-timer centralized controller (user interface).

   Under the other pages, press “CANCEL” to return to the main interface.

   Under the other pages, automatically return to the main interface when no operation for a period of time.

   The main interface displays the on-line condition of the indoor unit.

Figure 50



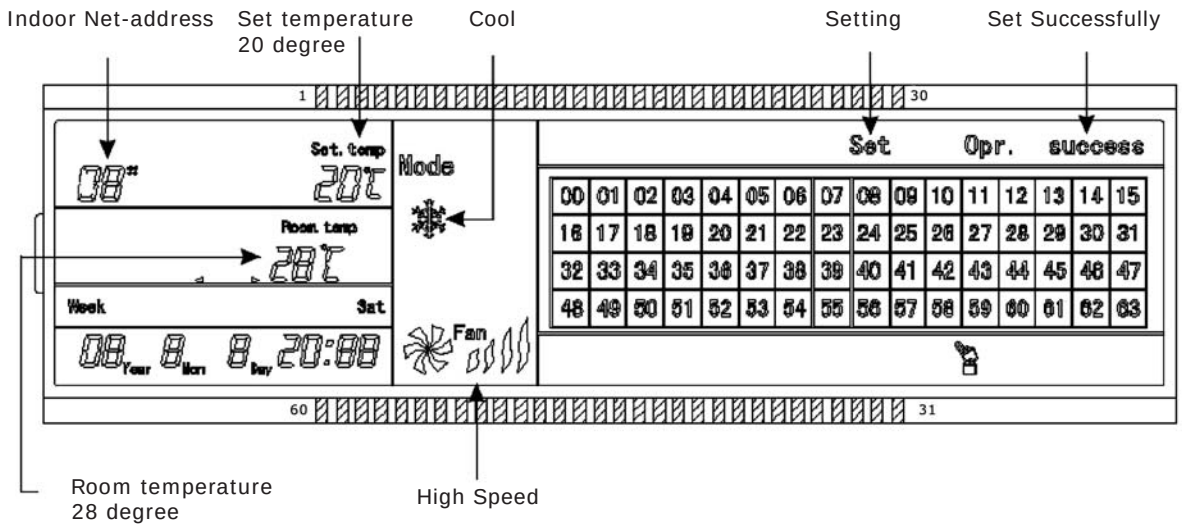
2. Setting interface of single weekly-timer centralized controller

   Under the main interface, press to select to the single setting interface

   Automatically return to the main interface when no operation for a period of time.

   Set the running status of single air conditioner under this page.

Figure 51



3. Setting interface of weekly timer parameters of single weekly-timer centralized controller.

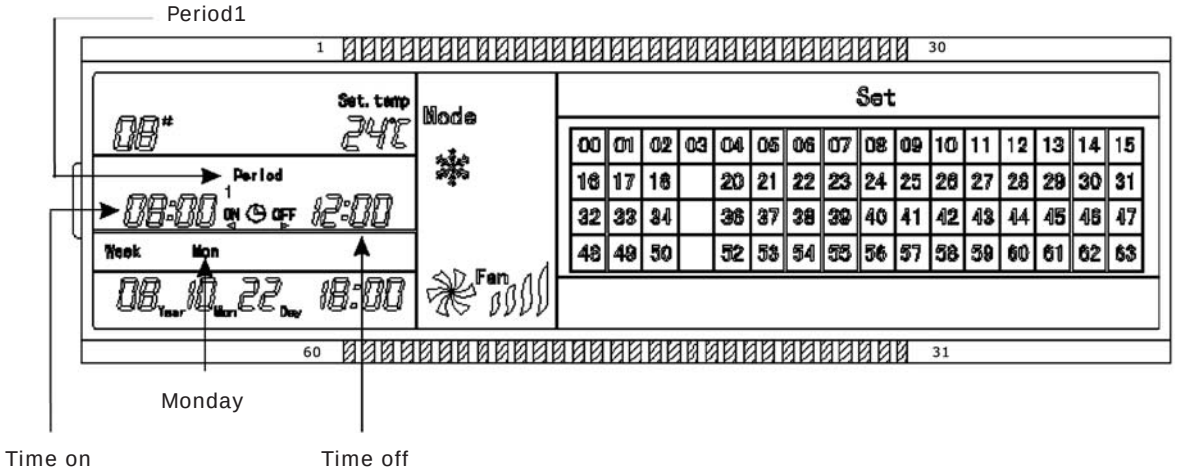
   Under the main interface, press to display the parameter setting interface of single weekly timer.

   The unit will automatically return to the main interface if no operation is performed for a period of time.

   Under this page, set the weekly timer parameters of single air conditioner, including startup time, shutdown time, the running mode of this period, temperature and wind speed.

   One air conditioner can be at most set with four periods in one day from Monday to Sunday, seven days in total.

Figure 52



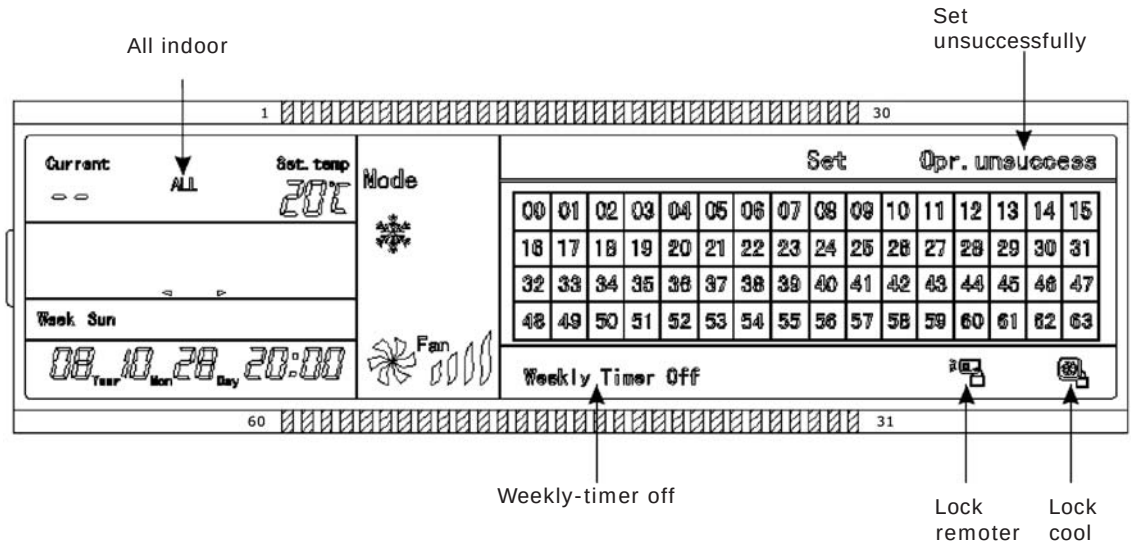
4. Unified setting interface of the weekly-timer central controller

   Under the main interface, press“SET”to display the unified setting interface.

   The unit will automatically return to the main interface if no operation is performed for a period of time.

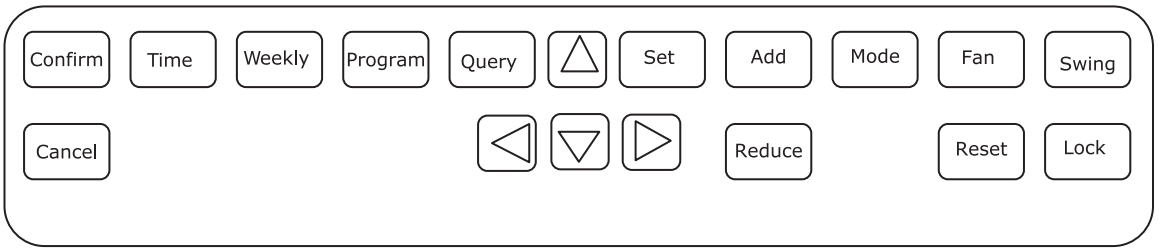
   Set the running mode of all air conditioners under this page, including mode, temperature and Fan speed.

Figure 53



Keyboard panel and button functions

Figure 54



1. On/Off key

   Press this button to start or stop the operation. Upon press for less than 5 seconds, the startup mode would be the last running mode of the air conditioner. Upon press for more than 5 seconds, the startup mode would be cooling mode, high fan speed at 24°C.

2. SET key

   Press the SET button, and then select set single or set all. Set single indicates to set the parameter (such as mode/ temperature/Fan speed/ weekly timer) of an single selected air conditioner. Set all indicates to set the parameter of all air conditioners controlled by the central controller.

3. Query key

   Press the Query button to query the running condition of the air conditioner, such as on/off, temperature setting, indoor temperature, fan speed and running mode. Press direction keys to select the air conditioner that you want to query.

4. Up, Down, Left, Right keys (Direction keys)

   When querying or setting the indoor units, press these four keys to select the indoor units that we need to set or query. When setting the weekly timer, it is used for selecting the day of the week and the time of startup and shutdown.

5. Add key

   When querying the indoor unit, press the Add button to query more parameter of the indoor unit. When setting the indoor unit, it is for adjust the setting temperature. When setting the weekly timer, it is for adjust the time of startup and shutdown.

6. Reduce key

   When querying the indoor unit, press the “Reduce” button to query more parameter of the indoor unit.

   When setting the indoor unit, it is used for modifying the setting temperature. When setting the weekly timer, it is used for modifying the time of startup and shutdown.

7. Mode key

   When setting the indoor unit, it is used for setting the running mode of the indoor unit, including Automation, Cooling, Heating, Fan mode, Dry and shutting down.

8. Fan key

   When setting the indoor unit, it is for setting the wind speed of the indoor, including high speed, medium speed, low speed and automatic speed.

9. Swing key

   In setting the indoor unit, it is used to set the swing function of the indoor unit. The running modes are swing on or swing off.

10. Lock key

    When setting, press the Lock button to lock the remote controller of all or single indoor unit. Press the Query button and hold under the main page, then repress the Lock button again to lock the keyboard of the central controller; press the Mode button and then press the Lock button again to lock the running mode.

11. Reset key

    The central controller re-scans the indoor unit in the network as recharging after power off.

12. Program key

    Under the main page, press the Program button to set the weekly timer of single indoor unit or all indoor units. Press the Query button and hold, and then press the Program button to query the weekly timer parameters of the indoor unit.

13. Weekly key

    Under the main page, press the Weekly button to start up or shut down the weekly timer function.

14. Time key

    Under the main page, press the Time button for 5 seconds to enter the time-modifying status, and then press Add or Reduce button to change the setting time. Press Left or Right to select minute/hour/day/month/year. Finally, press the Confirm button to save the modification.

15. Confirm key

    Save data and send the command required to the indoor unit, such as setting the mode of the air conditioner.

16. Cancel key

    Cancel the last operation and return to the last interface.

- **Installation of TMCCW002A**

  Installation

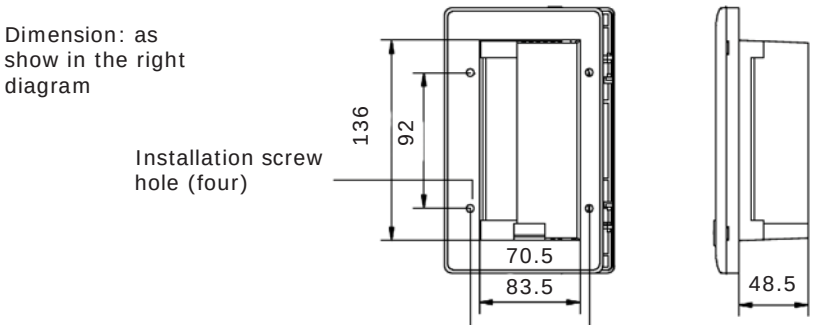
  Please use electrician switch case for the installation of the centralized controller.

  The thickness of the centralized controller cable shall be adjusted according to the length of the cable.

  Insert the flat tip screwdriver into the recess on the top panel of the case and slightly turn to open the top cover of the central controller.

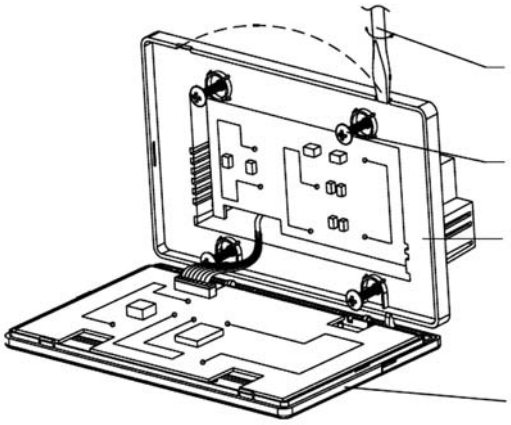
  Dimensions: 170×110×71mm

Figure 55



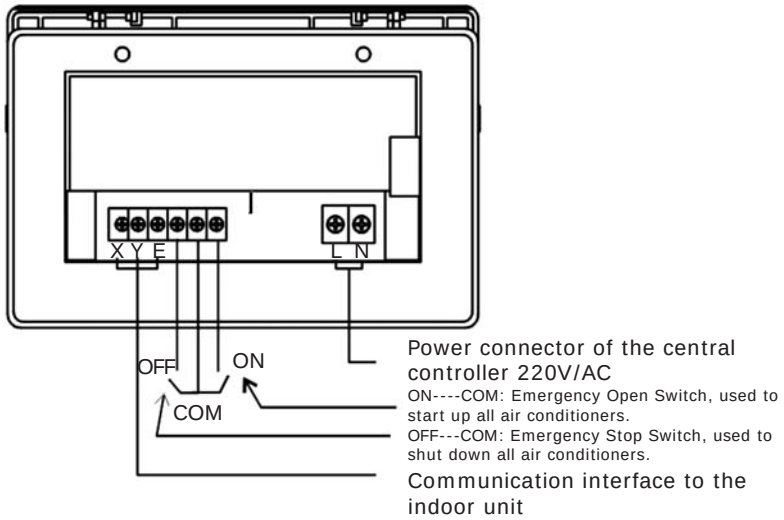
Ways to open the shell and fix the controller

Figure 56


Slightly turn flat tip screwdriver to open the top cover (two)
Screw (GB845/ST3.9*25) used for fixing the central controller
Base
Top cover

Ports of the controller

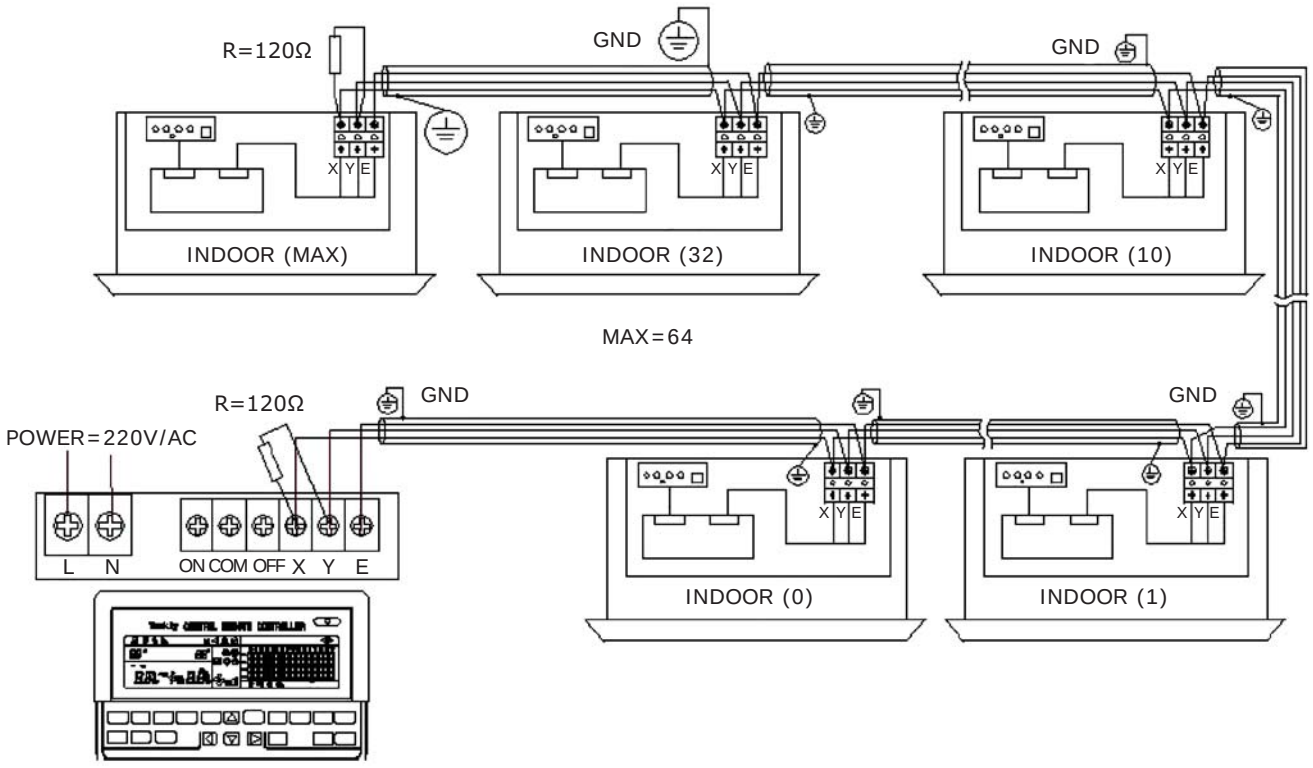
Figure 57


X Y E
L N
OFF
ON
COM
Power connector of the central controller 220V/AC
ON----COM: Emergency Open Switch, used to start up all air conditioners.
OFF---COM: Emergency Stop Switch, used to shut down all air conditioners.
Communication interface to the indoor unit

Wiring Diagram Map

Connecting diagram of network-based air conditioning system (There are two types of indoor units, namely indoor unit with external network interface module on the main control board or built-in network interface module in the main control board.)

Figure 58

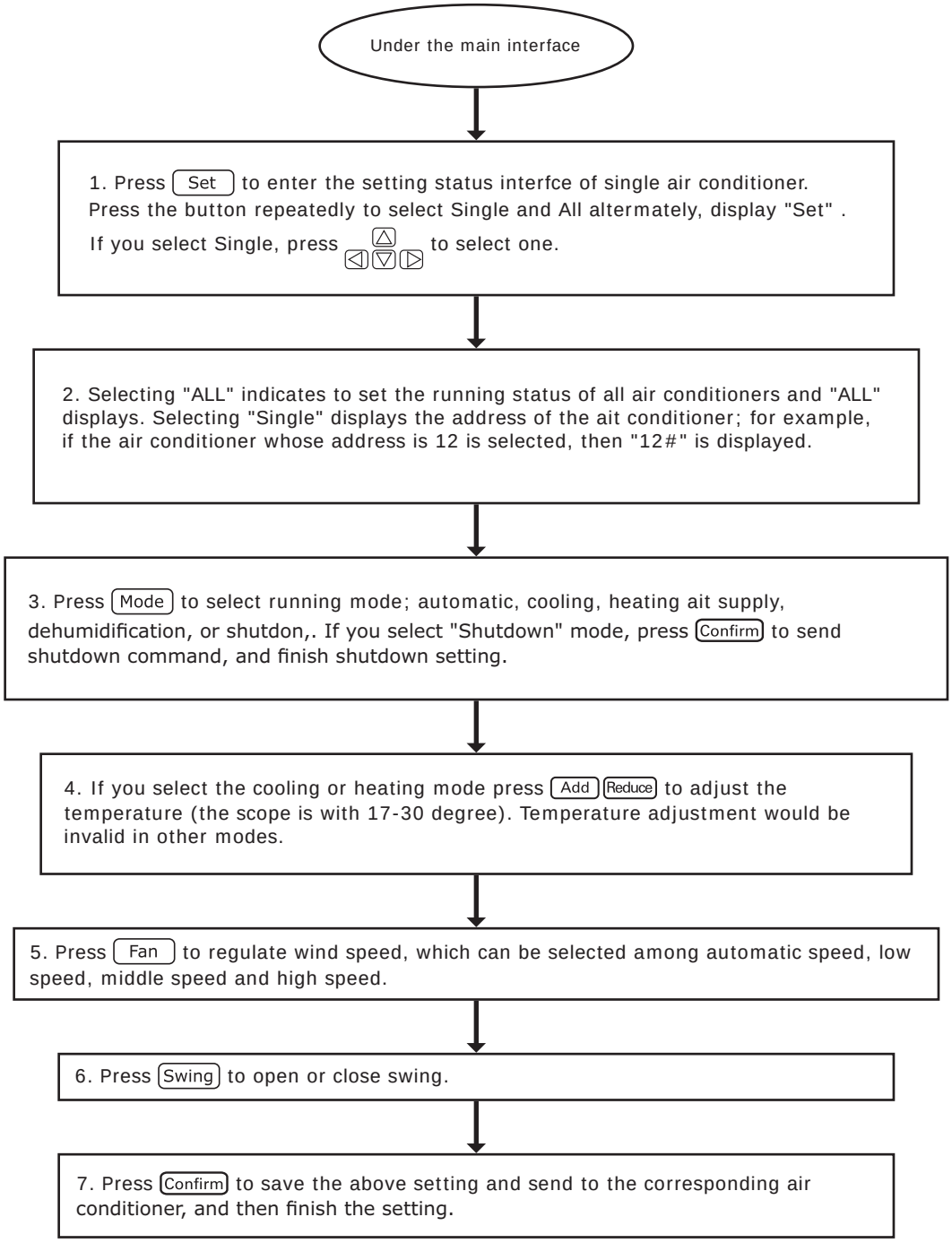


Connecting diagram for air-conditioning system with centralized network

- **How to use**

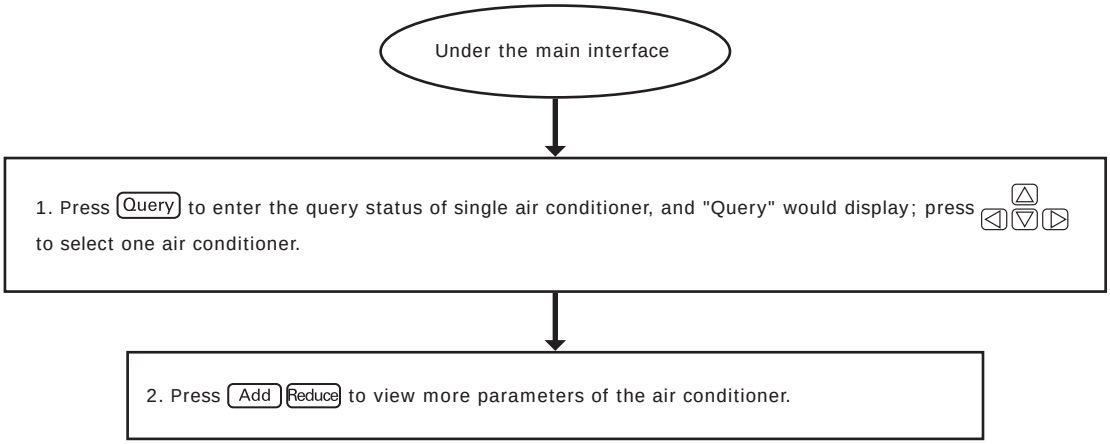
  1. How to set the running status of the air conditioner

Figure 59


Under the main interface
1. Press Set to enter the setting status interfce of single air conditioner. Press the button repeatedly to select Single and All altermately, display "Set" . If you select Single, press to select one.
2. Selecting "ALL" indicates to set the running status of all air conditioners and "ALL" displays. Selecting "Single" displays the address of the ait conditioner; for example, if the air conditioner whose address is 12 is selected, then "12#" is displayed.
3. Press Mode to select running mode; automatic, cooling, heating ait supply, dehumidification, or shutdon,. If you select "Shutdown" mode, press Confirm to send shutdown command, and finish shutdown setting.
4. If you select the cooling or heating mode press Add Reduce to adjust the temperature (the scope is with 17-30 degree). Temperature adjustment would be invalid in other modes.
5. Press Fan to regulate wind speed, which can be selected among automatic speed, low speed, middle speed and high speed.
6. Press Swing to open or close swing.
7. Press Confirm to save the above setting and send to the corresponding air conditioner, and then finish the setting.

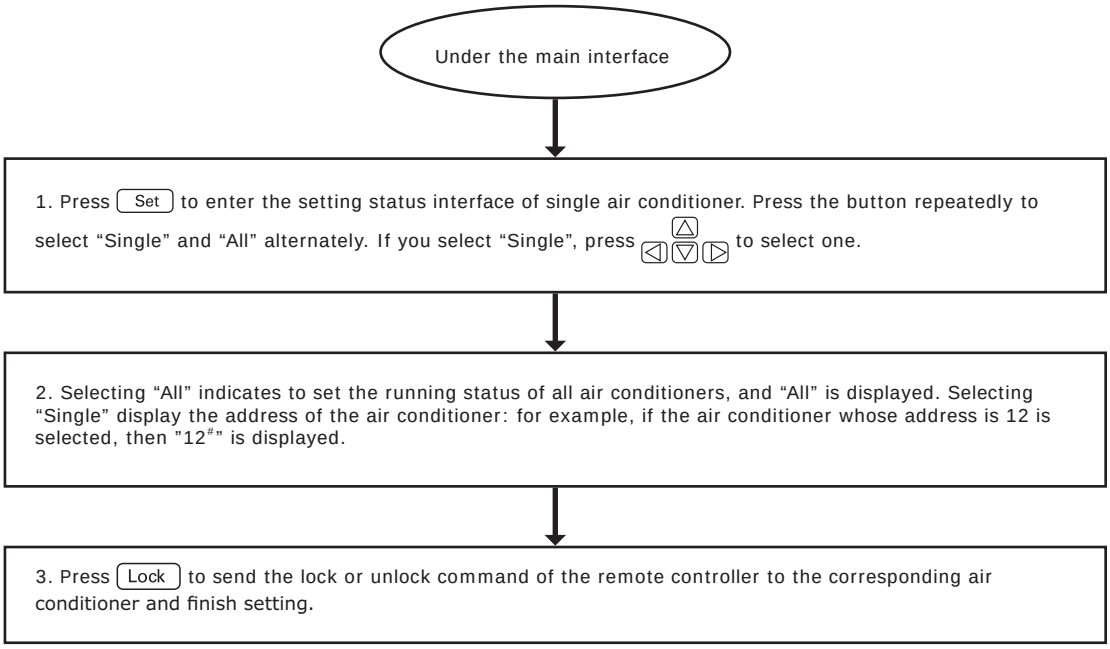
2. How to set the running status of the air conditioner

Figure 60


Under the main interface
1. Press Query to enter the query status of single air conditioner, and "Query" would display; press to select one air conditioner.
2. Press Add Reduce to view more parameters of the air conditioner.

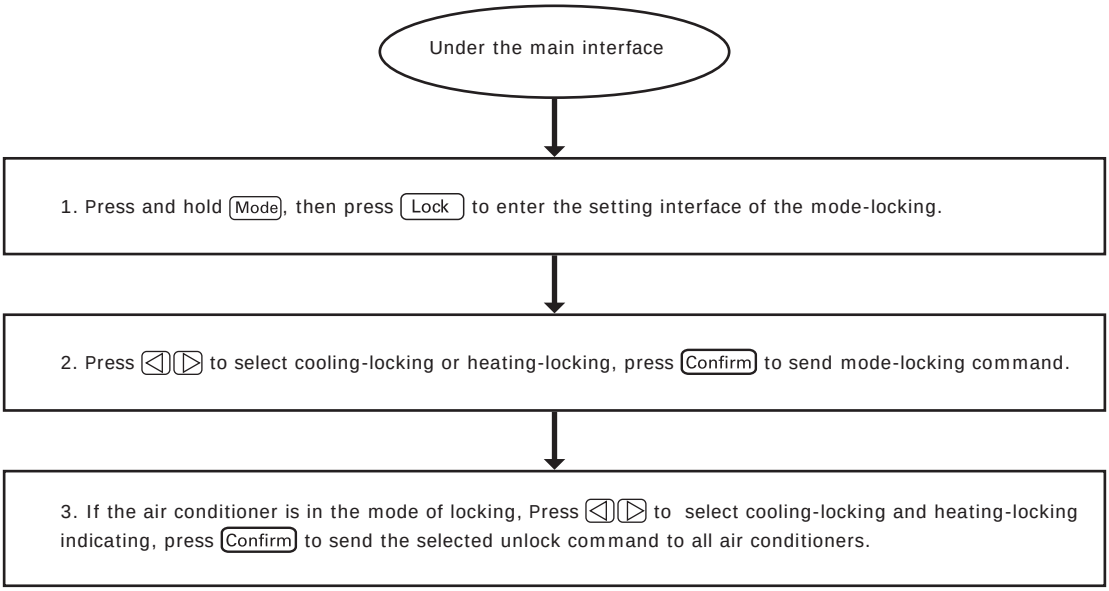
3. How to lock and unlock the remote controller of the air conditioner?

Figure 61


Under the main interface
1. Press Set to enter the setting status interface of single air conditioner. Press the button repeatedly to select “Single” and “All” alternately. If you select “Single”, press to select one.
2. Selecting “All” indicates to set the running status of all air conditioners, and “All” is displayed. Selecting “Single” display the address of the air conditioner: for example, if the air conditioner whose address is 12 is selected, then ”12#” is displayed.
3. Press Lock to send the lock or unlock command of the remote controller to the corresponding air conditioner and finish setting.

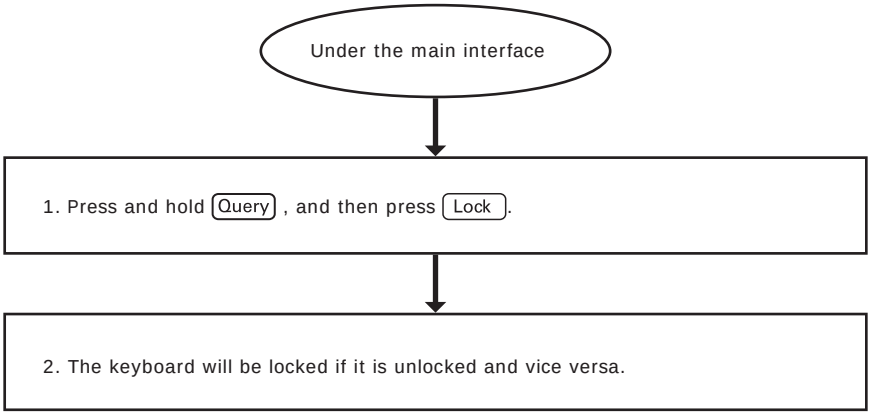
4. How to lock and unlock the mode of the air conditioner?

Figure 62


Under the main interface
1. Press and hold Mode, then press Lock to enter the setting interface of the mode-locking.
2. Press ◁ ▷ to select cooling-locking or heating-locking, press Confirm to send mode-locking command.
3. If the air conditioner is in the mode of locking, Press ◁ ▷ to select cooling-locking and heating-locking indicating, press Confirm to send the selected unlock command to all air conditioners.

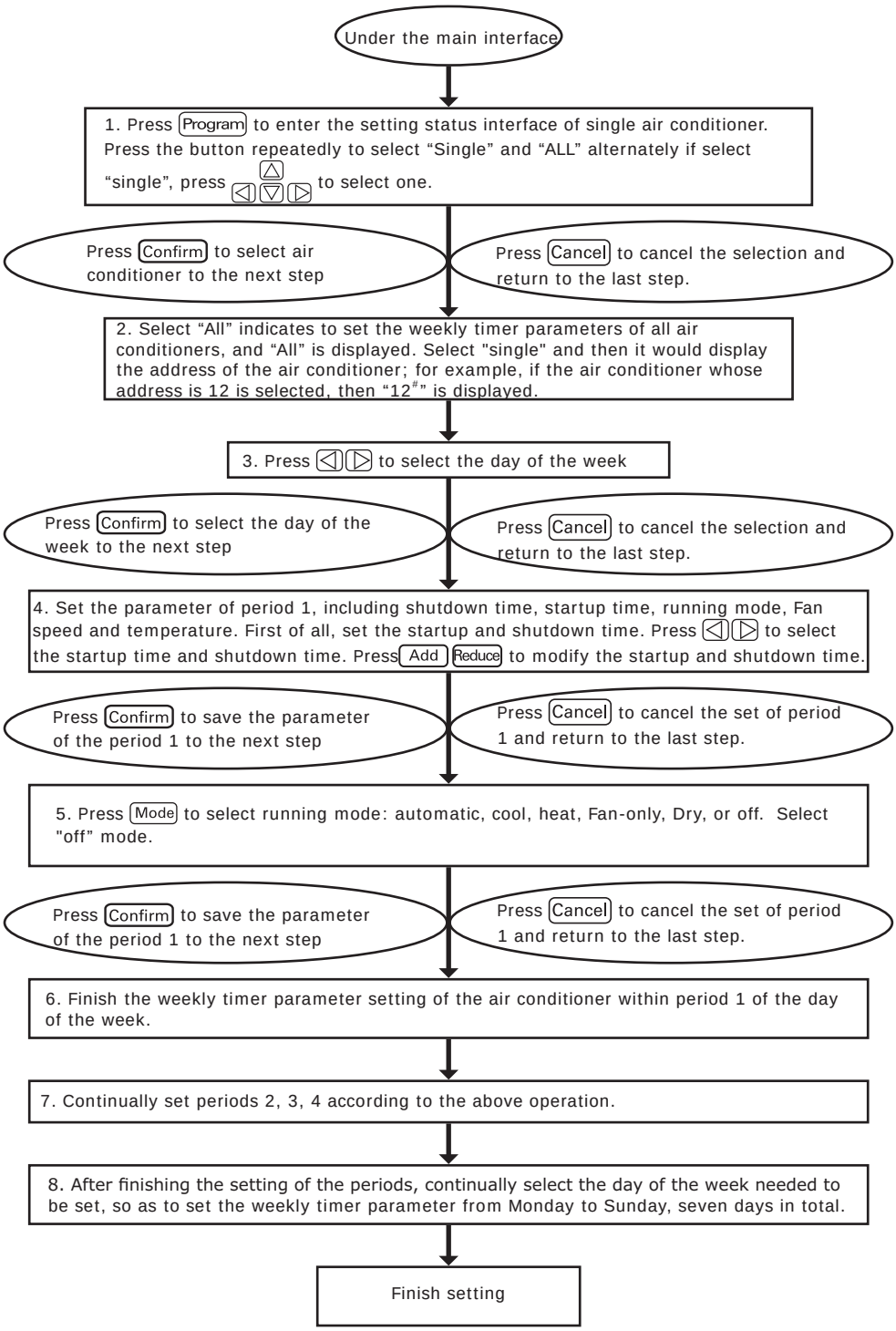
5. How to lock and unlock the key board of the weekly-timer centralized controller?

Figure 63


Under the main interface
1. Press and hold Query , and then press Lock.
2. The keyboard will be locked if it is unlocked and vice versa.

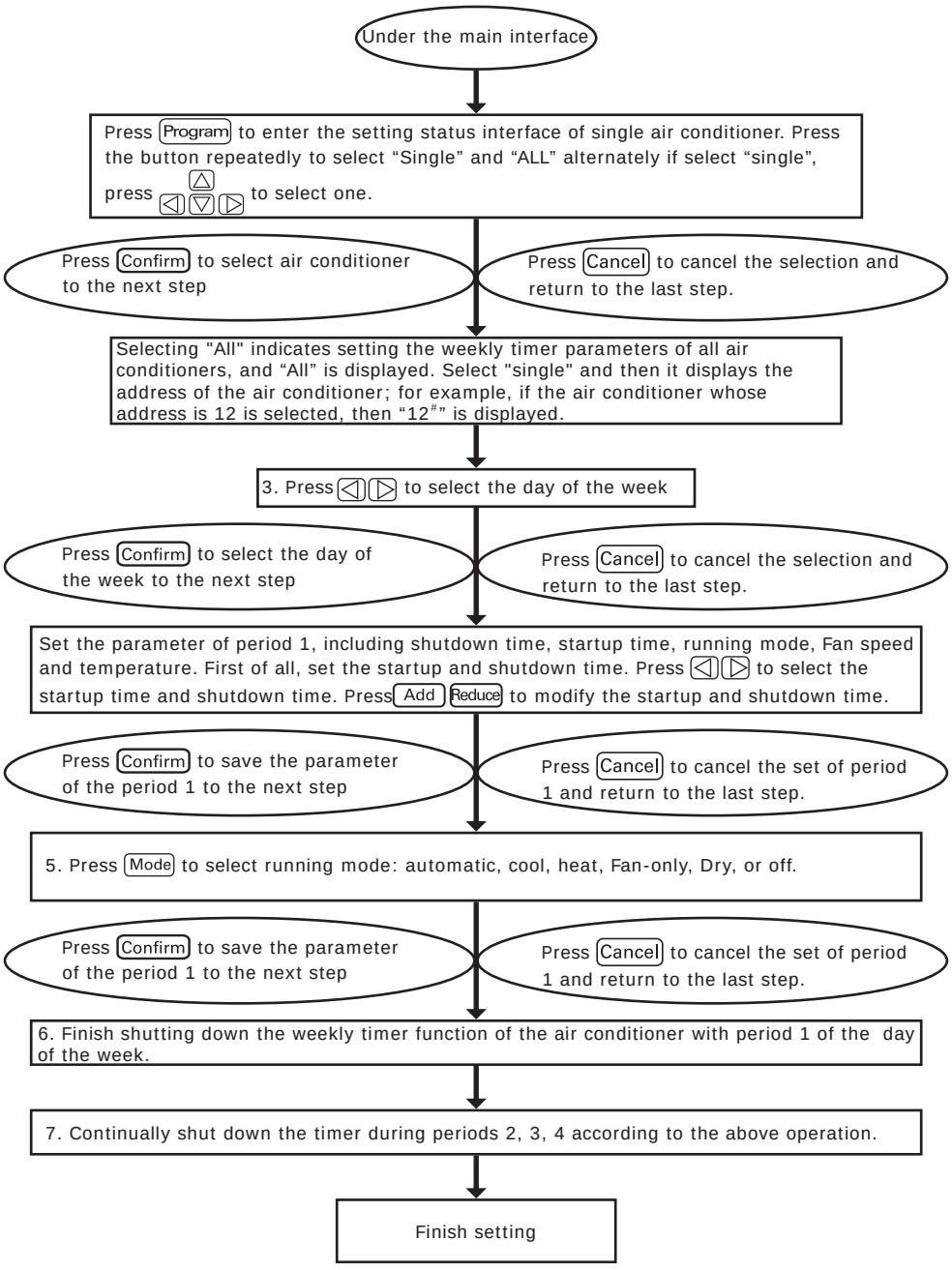
6. How to set the function and relevant parameters of the weekly timer of the air conditioner?

Figure 64


Under the main interface
1. Press Program to enter the setting status interface of single air conditioner. Press the button repeatedly to select “Single” and “ALL” alternately if select “single”, press to select one.
Press Confirm to select air conditioner to the next step
Press Cancel to cancel the selection and return to the last step.
2. Select “All” indicates to set the weekly timer parameters of all air conditioners, and “All” is displayed. Select "single" and then it would display the address of the air conditioner; for example, if the air conditioner whose address is 12 is selected, then “12#” is displayed.
3. Press to select the day of the week
Press Confirm to select the day of the week to the next step
Press Cancel to cancel the selection and return to the last step.
4. Set the parameter of period 1, including shutdown time, startup time, running mode, Fan speed and temperature. First of all, set the startup and shutdown time. Press to select the startup time and shutdown time. Press Add Reduce to modify the startup and shutdown time.
Press Confirm to save the parameter of the period 1 to the next step
Press Cancel to cancel the set of period 1 and return to the last step.
5. Press Mode to select running mode: automatic, cool, heat, Fan-only, Dry, or off. Select “off” mode.
Press Confirm to save the parameter of the period 1 to the next step
Press Cancel to cancel the set of period 1 and return to the last step.
6. Finish the weekly timer parameter setting of the air conditioner within period 1 of the day of the week.
7. Continually set periods 2, 3, 4 according to the above operation.
8. After finishing the setting of the periods, continually select the day of the week needed to be set, so as to set the weekly timer parameter from Monday to Sunday, seven days in total.
Finish setting

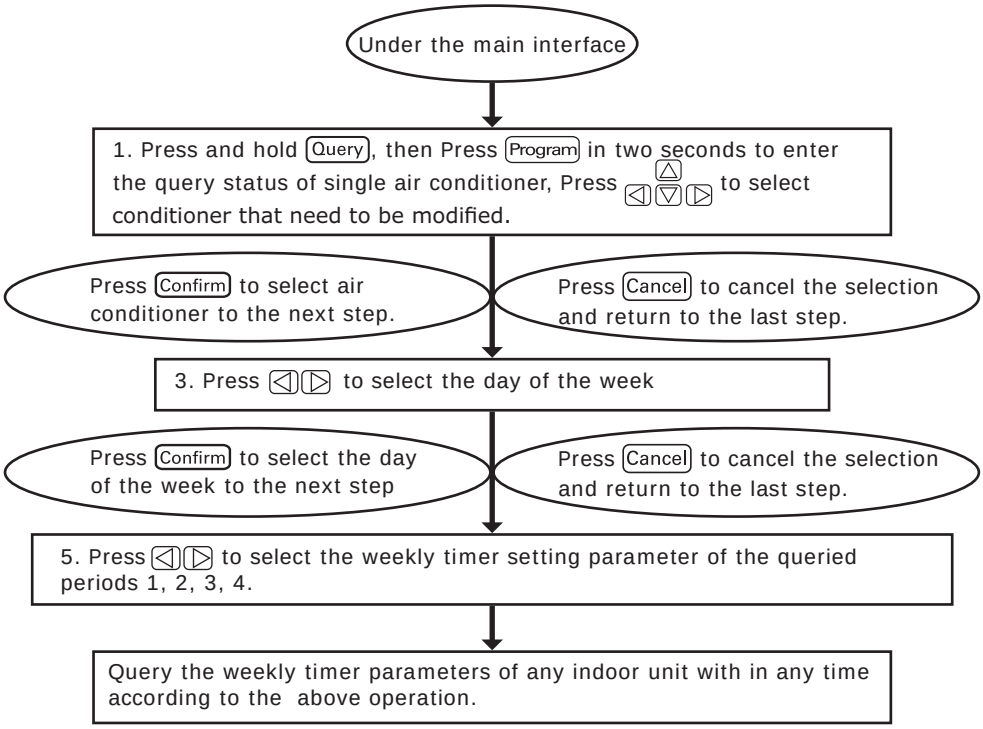
7. How to turn off the weekly timer setting of a period of an air conditioner?

Figure 65


Under the main interface
Press Program to enter the setting status interface of single air conditioner. Press the button repeatedly to select “Single” and “ALL” alternately if select “single”, press △ ◁ ▽ ▷ to select one.
Press Confirm to select air conditioner to the next step
Press Cancel to cancel the selection and return to the last step.
Selecting "All" indicates setting the weekly timer parameters of all air conditioners, and “All” is displayed. Select "single" and then it displays the address of the air conditioner; for example, if the air conditioner whose address is 12 is selected, then “12#” is displayed.
3. Press ◁ ▷ to select the day of the week
Press Confirm to select the day of the week to the next step
Press Cancel to cancel the selection and return to the last step.
Set the parameter of period 1, including shutdown time, startup time, running mode, Fan speed and temperature. First of all, set the startup and shutdown time. Press ◁ ▷ to select the startup time and shutdown time. Press Add Reduce to modify the startup and shutdown time.
Press Confirm to save the parameter of the period 1 to the next step
Press Cancel to cancel the set of period 1 and return to the last step.
5. Press Mode to select running mode: automatic, cool, heat, Fan-only, Dry, or off.
Press Confirm to save the parameter of the period 1 to the next step
Press Cancel to cancel the set of period 1 and return to the last step.
6. Finish shutting down the weekly timer function of the air conditioner with period 1 of the day of the week.
7. Continually shut down the timer during periods 2, 3, 4 according to the above operation.
Finish setting

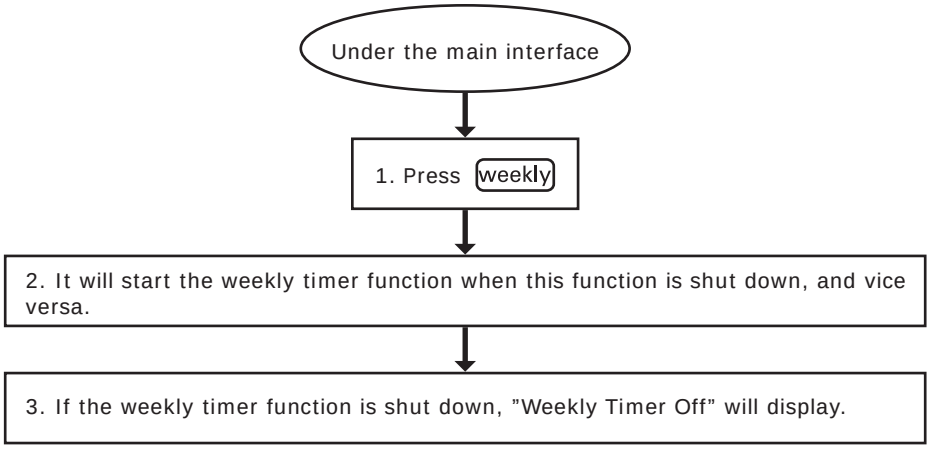
8. How to query the weekly timer setting parameter of the air conditioner?

Figure 66


Under the main interface
1. Press and hold Query, then Press Program in two seconds to enter the query status of single air conditioner, Press to select conditioner that need to be modified.
Press Confirm to select air conditioner to the next step.
Press Cancel to cancel the selection and return to the last step.
3. Press to select the day of the week
Press Confirm to select the day of the week to the next step
Press Cancel to cancel the selection and return to the last step.
5. Press to select the weekly timer setting parameter of the queried periods 1, 2, 3, 4.
Query the weekly timer parameters of any indoor unit with in any time according to the above operation.

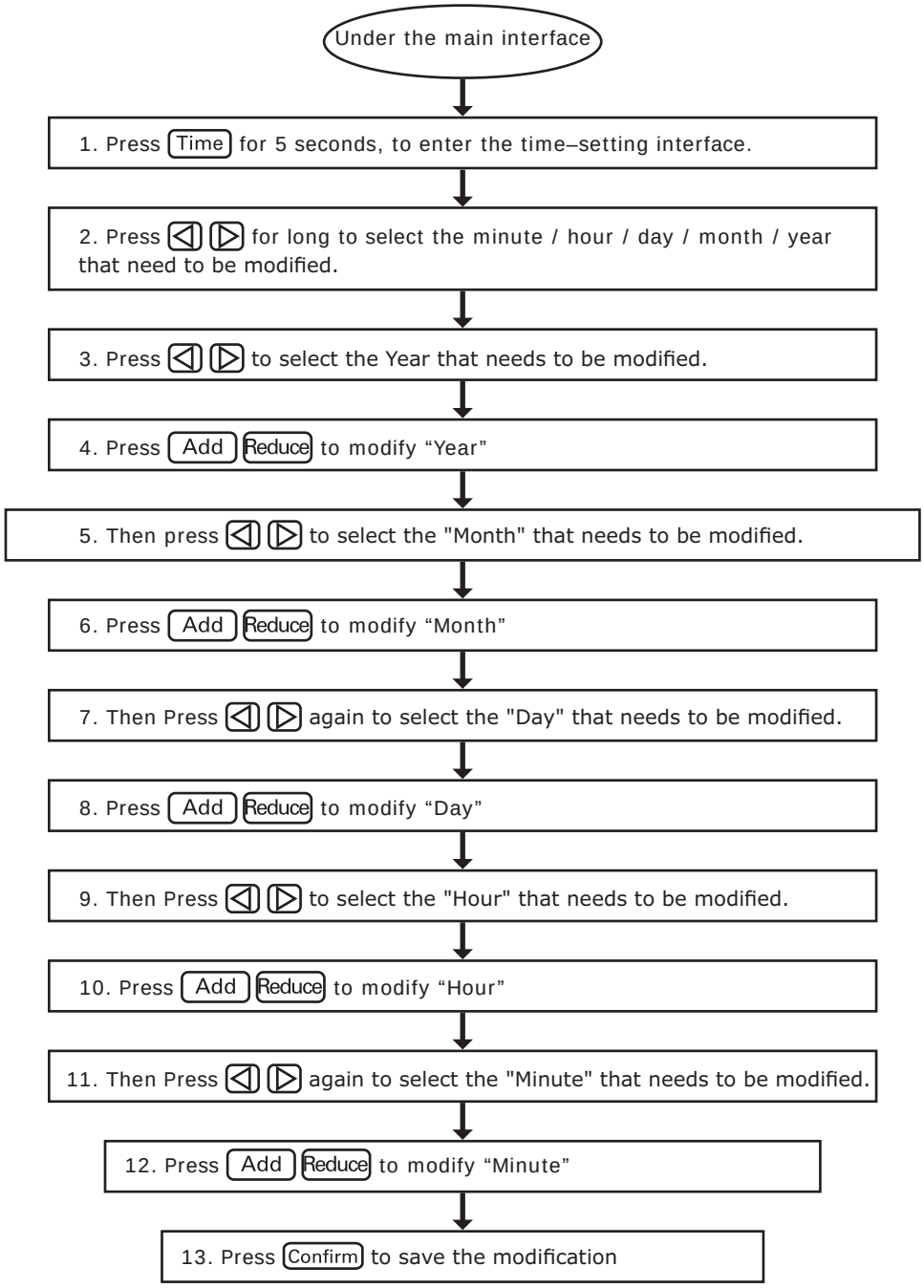
9. How to start or shut down the weekly timer function of all air conditioner units?

Figure 67


Under the main interface
1. Press weekly
2. It will start the weekly timer function when this function is shut down, and vice versa.
3. If the weekly timer function is shut down, "Weekly Timer Off" will display.

10. How to start or shut down the weekly timer function of all air conditioner units?

Figure 68


Under the main interface
1. Press Time for 5 seconds, to enter the time–setting interface.
2. Press ◁ ▷ for long to select the minute / hour / day / month / year that need to be modified.
3. Press ◁ ▷ to select the Year that needs to be modified.
4. Press Add Reduce to modify “Year”
5. Then press ◁ ▷ to select the "Month" that needs to be modified.
6. Press Add Reduce to modify “Month”
7. Then Press ◁ ▷ again to select the "Day" that needs to be modified.
8. Press Add Reduce to modify “Day”
9. Then Press ◁ ▷ to select the "Hour" that needs to be modified.
10. Press Add Reduce to modify “Hour”
11. Then Press ◁ ▷ again to select the "Minute" that needs to be modified.
12. Press Add Reduce to modify “Minute”
13. Press Confirm to save the modification

Note:

There is always a time interval between 2 periods. This mean the period’s off time should not be the same as the starting time of next work period. The least time interval should be 10 minutes, otherwise the units would not work as expected.

Error codes and protection codes tables

Table 41

Fault code	Content
EF	Other faults
EE	Water level detection faults
ED	Outdoor unit fault
EC	Cleaning fault
EB	Inverter module protection
EA	Current of compressor is too large (4 Times)
E9	Fault of communication between main board and display board
E8	Wind blowing speed is out of control
E7	EEPROM error
E6	Detection of current direction alternating is abnormal
E5	T3 or T4 temp.senor of discharge of compressor fails down
E4	T2B sensor fails to work normally
E3	T2A sensor fails to work normally
E2	T1 sensor fails to work normally
E1	Communication fault
E0	Phase sequence disorder or loss of power phase
07#	
06#	
05#	
04#	
03#	Communication mistake between centralized controller and PC (gateway)
02#	Communication mistake between centralized controller and functional module
01#	Communication mistake between centralized controller and network interface module
00#	Communication mistake between network interface module and main control board

Table 42

Protection code	Content
PF	Other protection
PE	Reserved
PD	Reserved
PC	Reserved
PB	Reserved
PA	Reserved
P9	Reserved
P8	Compressor's current is too large
P7	Voltage of power supply is too high or too low
P6	Pressure of discharge is too low
P5	Pressure of discharge is too high
P4	Temp.of discharge pipe is abnormal
P3	Temp.of compressor is abnormal
P2	Condenser high-temperature protection
P1	Anti cool air or defrost protection
P0	Evaporator temperature protection

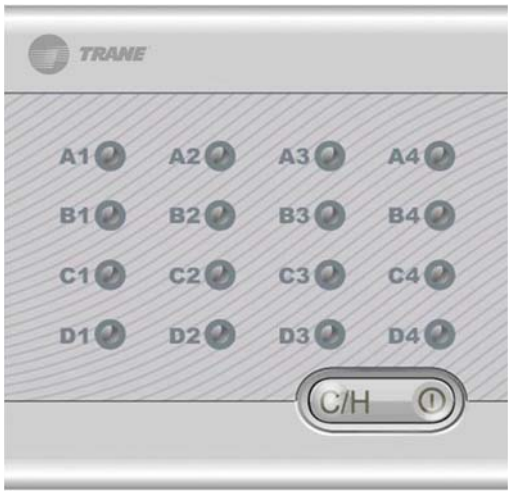
Note: *These two tables are the same with centralized controller TMCCW001A.*

General controller TMCCW003A

TMCCW003A is a unified contralized controller, which could control up to 16 indoor units simply and compactly. It commands the indoor unit to work in only 2 modes, cooling and heating. Additionally, users could also modify the working mode via remote wireless controller.

This controller could not connect the units to the PC.

Figure 69

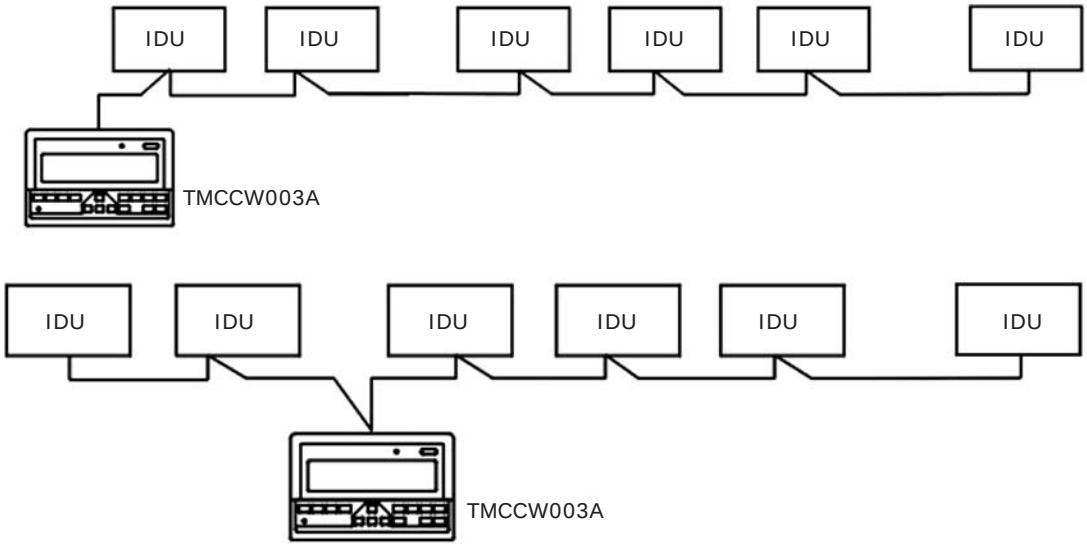


- Centralized Control
  Short press:
  Can only turn ON/OFF the last indoor units which is still operating.
  Long press (3 seconds):
  Can Turn ON/OFF all indoor units.
- Operation Mode Selection Switch (Cooling,Heating)
- Overall/mono-control the indoor units
- Sleep and memory function
  If no operation to be conducted at the controller after 25 seconds, system would enter to sleep mode, all indicators are faded. Press any key to recovery the displaying.
- Compatible with centralized control.

- **System configure**

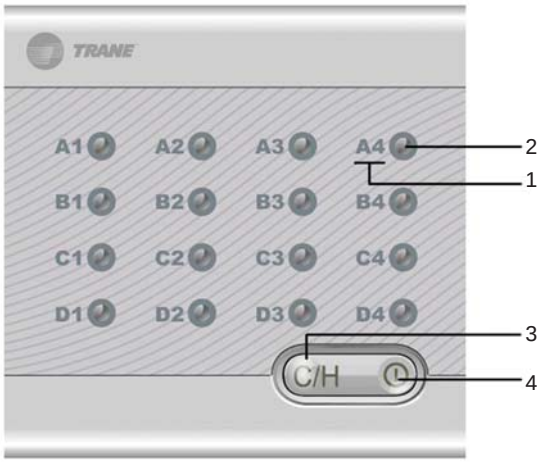
  TMCCW002A controller needs to be connected with other indoor units in a hand-in-hand way, which is the same connecting way with TMCCW001A. Either of the connecting ways below is available.

Figure 70



Discription Names and Funtions

Figure 71



1. Corresponding indoor unit tag

   The centralized controller can control up to 16 indoor units. But it would fail with more than 16 indoor units. Before using this controller, please set the indoor unit network address codes properly. The following table show the relation between the tag and the corresponding network:

Table 43

Air condition lable	A1	A2	A3	A4	B1	B2	B3	B4
Network address	0	1	2	3	4	5	6	7
Ari condition lable	C1	C2	C3	C4	D1	D2	D3	D4
Network address	8	9	10	11	12	13	14	15

The corresponding indication of the air conditioner reflects the working mode of its indoor unit,blue

means cooling or air supply mode, red means heating mode.

2. Single indoor unit On/Off key

   Users could press this key to turn on or turn off the corresponding indoor unit. If the indoor units original mode is on, press this would turn it off and vice versa. The interval between controlling 2 different unit should be more than 0.6 second. If less, the operation is invalid and of no use.

Note:

- *If the red light flashes quickly, it means the corresponding indoor unit malfunctions.*
- *If no one press the keys of the controller, the controller would turn itself into power saving mode, in which all the lights fade out. Press any key to stop this mode.*

3. Unified mode setting key

   Press this key to set all the units' mode. Only two mode can be set by this key. They are the cooling mode and the heating mode. The details of the two mode are as follows:

Table 44

	Temperature	Fan Speed	Key light
Cooling mode	20°C	Hi speed	Blue
Heating mode	28°C	Hi speed	Red

Note:

The interval between these two mode alternating should be more than 6 seconds. If less, the alternating would be invalid and of no use. When the indoor unit's working mode is changed by other device, such as remote controller, this centralized controller could detect, and change the corresponding units tag to show the actual running mode.

4. Unified On/Off key

   This key has 2 ways to send commands:

   Press for 3 seconds or more: to turn on or off all the indoor units that are connected to this controller.

   Press for less than 3 seconds: to turn on or turn off the single unit that we ever controlled most latterly.

Note:

If this key's light flash quickly, it means that the EEPROM malfunctions.

- **Installation of TMCCW003A**

  Dimensions: 90×86×8mm

Figure 72

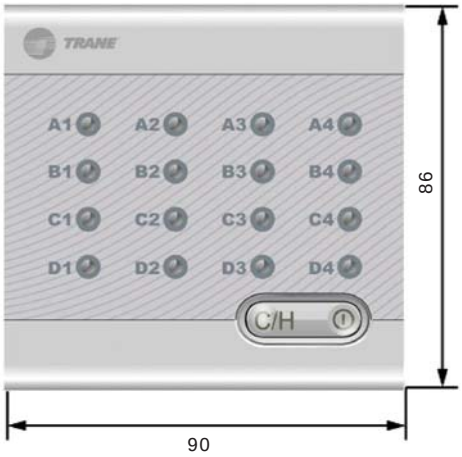
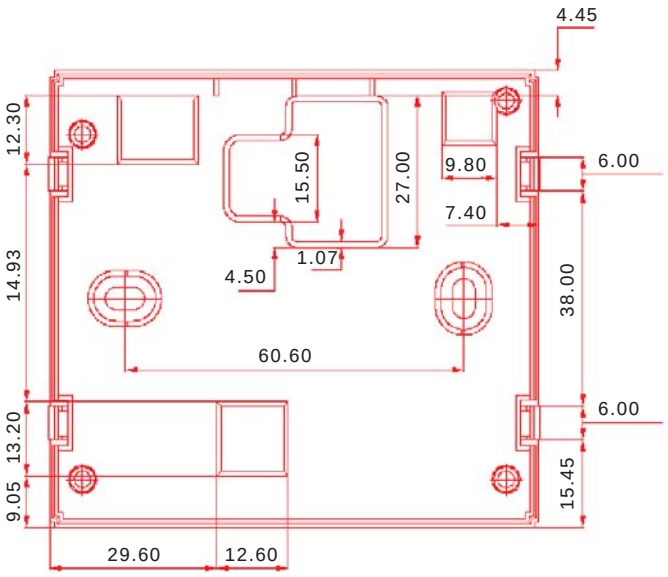
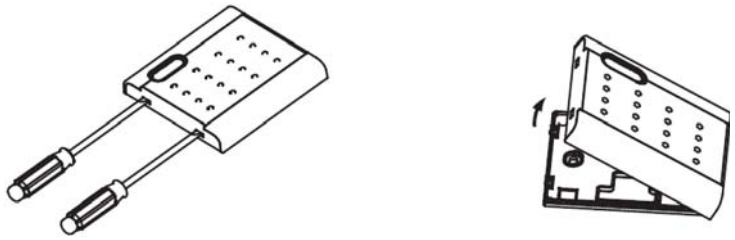


Figure 73



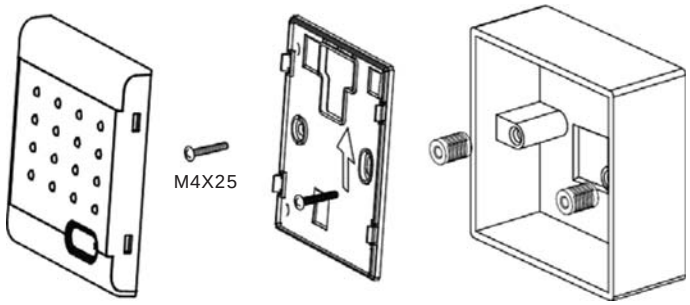
1. Please to connect the 2-core and 3-core shielded wire to imbed the wall correctly.
2. When no less than 3 pieces of TMCCW003A install nearly, please keep over 2m distance each other to avoid interference.

Figure 74



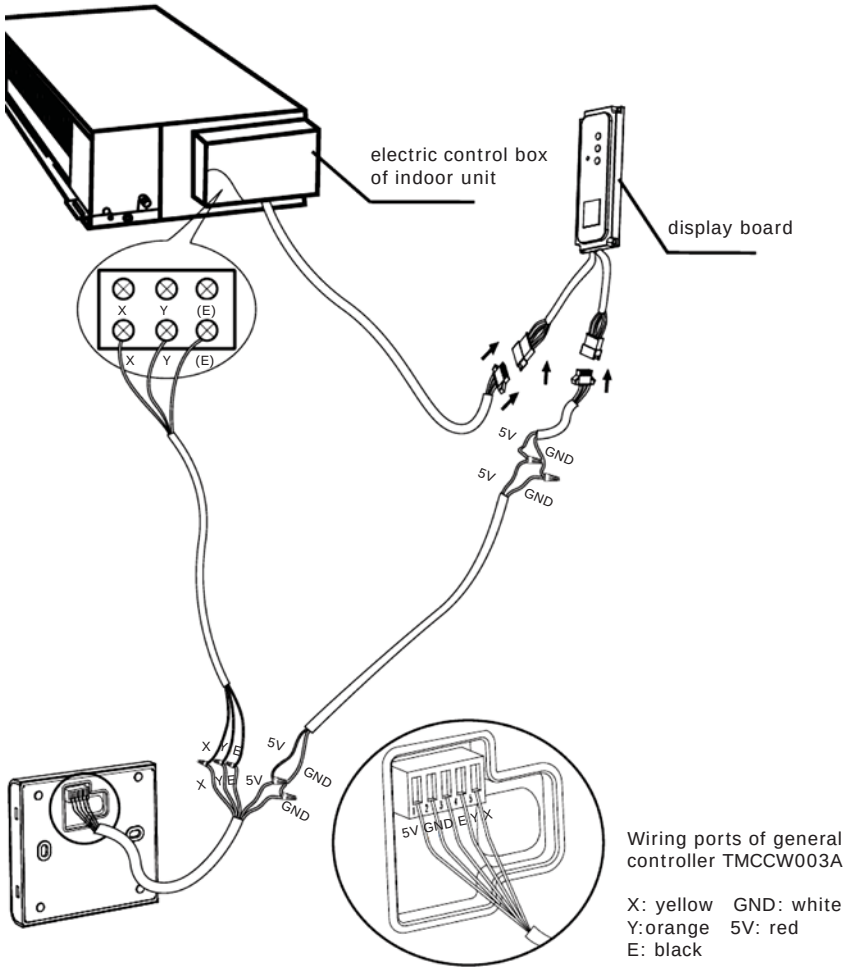
Note: *If this key's light flash quickly, it means that the EEPROM malfunctions.*

Figure 75



TMCCW003A should be connected in a hand-in-hand way to the indoor units. Without power transforming function, this controller should obtain 5V power from the indoor units display panel. In fact, the display panel usually has a port in which two of pins are the 5V and GND. These two pins can be connected to the TMCCW003A.

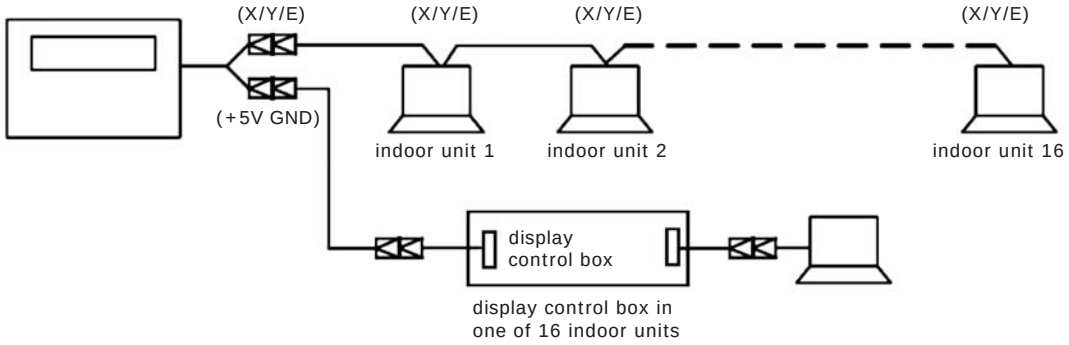
Figure 76



Note:

TMCCW003A uses a DC 5V power. Be noted not to connect strong electricity power to TMCCW003A, otherwise malfunction would be caused.

Figure 77



Note:

- *TMCCW003A could connect to 16 indoor units at most, otherwise malfunction would be caused.*
- *Please correctly set network address of indoor unit and reference to the address table above.*
- *Any 2 indoor units' network address cannot be same; otherwise system will detect only one of them.*

- **Lights displays and error code**

Table 45

Light	Blue	Red	Flash
Single On/Off key	Cooling/Fan	Heating	IDU Error
Unified On/Off key			EEPROM Error

Centralized controller TOCCW001A

TOCCW001A is a control monitoring device used to monitor the outdoor units' status.

Moreover, TOCCW001A is able to bridge the outdoor units to the gateway, and then realize the BMS monitoring, which makes the building management visible and one-station.

Figure 78

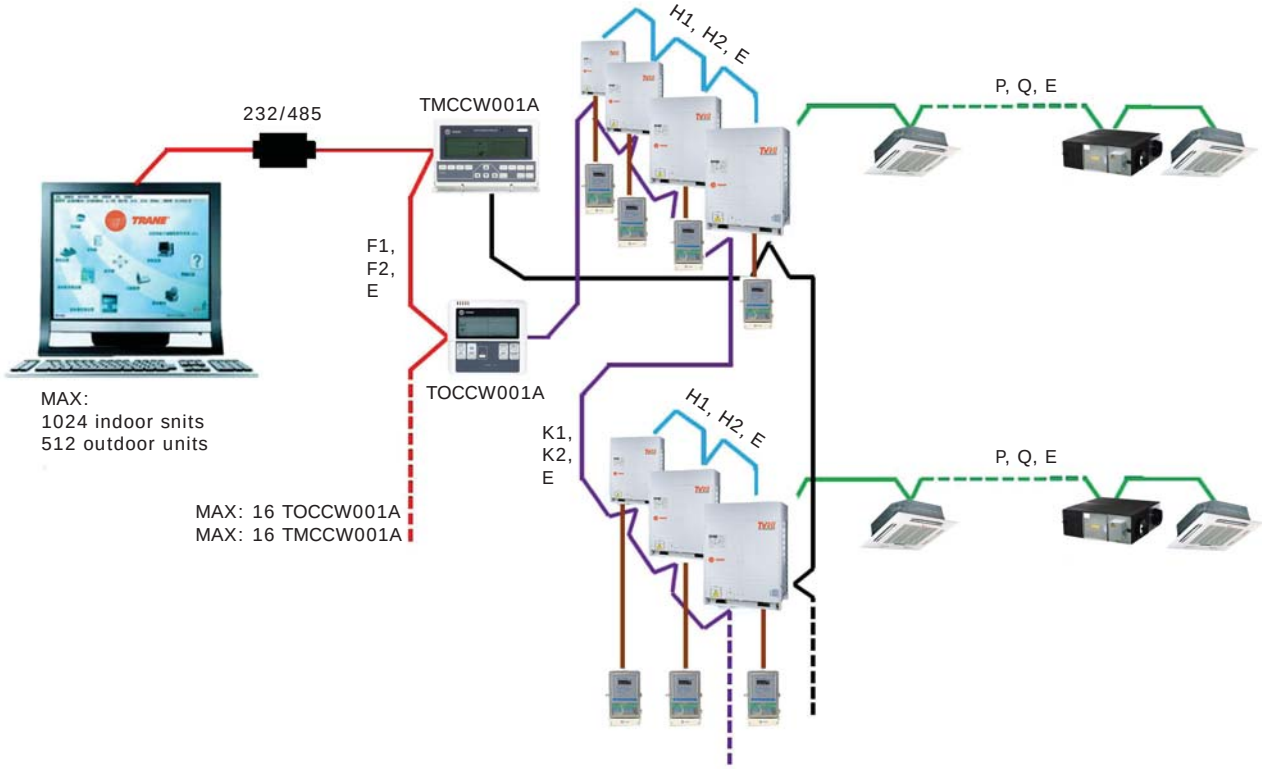
- RS485 communication protocol
- Up to 8 systems, max. 32 outdoor units can be connected to centralized monitor
- It can display the operating parameter of outdoor units
- It can display the error or protection code of outdoor units

- **System configure**

  With TOCCW001A, we could both centrally display the outdoor units' running status and bridge up to 32 outdoor units to the PC monitoring software or BMS--Building Management System. In fact, for the purpose of connecting the indoor units to the PC or the gateway, which makes the outdoor units visible on the display panel, TOCCW001A is necessary.

  The location of TOCCW001A in the network is as follows.

Figure 79



Be noted to the following issues to establish a steady network.

- The signal wire should be 3-core shielded wire and the wire should be provided by licensed electricians.
- To make signal transmission steady and protect the facilities, the signal transmission wires should not be near to the power line. An interval of 300mm-500mm should exist between these two kinds of wires.
- The signal wire of each network should be less than 1,200m.
- The unit and the centralized controller should be connected hand-in-hand, which means that all the units' same port should be connected to a 3-core wire and the signal wire should be linear in topology. Otherwise, the facilities could not work normally.

- **Description of Names and Functions**

Key Words and Basic Functions

After the centralized controller is power on or reset, all the segments on LCD will be displayed and last for 3 seconds.

And then disappear for 2 seconds. After this, the controller's system runs at normal display mode, in which centralized controller would display the main page.

Network Area Address Setting

Up to 16 TOCCW001A can be connected to the gateway or the PC. Each TOCCW001A can be view as a secondary or sub-net of the network and distinguish themselves by their unique address. The address can be set in the key panel and range from 16-31.

Address setting method:

To differentiate the TOCCW001A and TMCCW001A, the addresses of TOCCW001A range from 16-31. Every time we press the address button of a TOCCW001A, the corresponding TOCCW001A' s address increase by 1. When the address come to the end 31, press the key again could make the address back to the starting address

Indicator Display

Indicator light will be on when the TOCCW001A is powered on.

TOCCW001A LOCKED

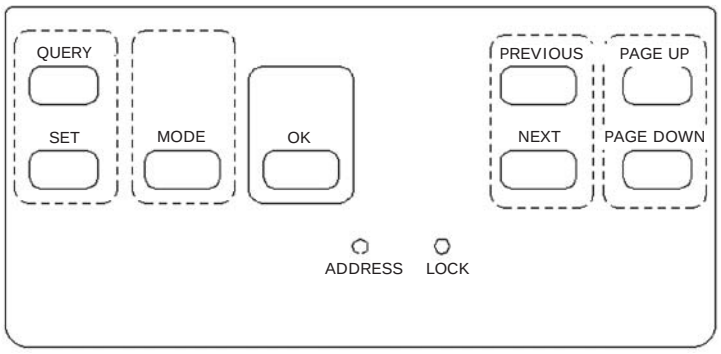
Press this button to start the lock mode. In lock mode, all the buttons are invalid, except the LOCK button. Press LOCK button again to cancel this mode.

Electricity consumption query

TOCCW001A allows user to check each outdoor units' electricity consumption. To realize this function, each outdoor unit should be installed with an ammeter. The ammeter TSNEA002A can be purchased from Trane Company.

Buttons and Functions

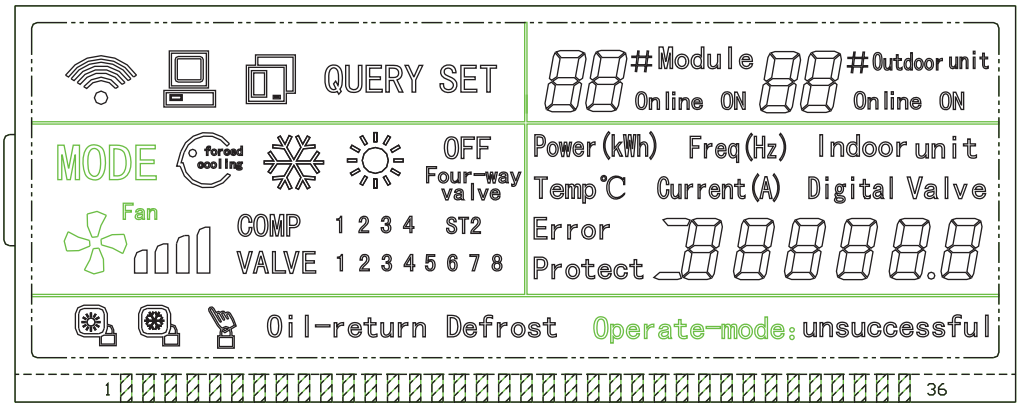
Figure 80



1. QUERY: Press this button to enter into the query state
2. PREVIOUS: On the query state, press it to query in default the running status of a previous online air conditioner.
3. NEXT: On the query state, press it to query in default the running status of a next online air conditioner.
4. PAGE UP: Press the PAGE UP button when choosing an online air conditioner on the query mode to display the parameters in previous page.
5. PAGE DOWN: Press the PAGE DOWN button when choosing an online air conditioner on the query mode to display the parameters in next page.
6. SET: Press SET button to enter into Set Page.
7. MODE: Pressing MODE button to enter into MODE setting function. Users can set the indoor unit to the Force Cool mode or OFF mode.
8. OK: Pressing OK button to confirm all settings and send the setting signals to the corresponding air-conditioners.
9. LOCK: Press this button to disable other buttons and prevent users from pressing the other button neglectfully. Press this button again to quit the lock status.
10. ADDRESS: In set page, press the SET button repeatedly, the address number will be increased by one. If you continue to press after the address amounts to 31, the address will restart from16.

Description of LCD Screen

Figure 81



Data Delivering

1. Figure means centralized controller is sending query order;
2. Figure means centralized controller is in communication connection with PC, and it will be off in 20 seconds with no communication;
3. Figure means centralized controller is in communication connection with outdoor unit, and it will be off in 20 seconds with no communication;
4. Press the OK button in setting page and waiting for 4 seconds, “successful” or “unsuccessful” will be shown in the operation state area.

Stand-by Page Display:

1. Figure

means the total number of online modules;
2. Figure

means the total number of online outdoor units;
3. Stand-by Page can display the address of centralized controller with the address format of “Addr xx”. Here “xx” equals the real address of centralized controller plus 16. Therefore, the range of “xx” is 16-31.

Query Page Display:

1. Query Page Display the symbol of query.
2. Displaying the selected outdoor unit with address of

and

.
3. Mode display: means cool, means heat, means shut off, means cooling mode only, means heating mode only.
4. Fan Speed Display: means low speed, means middle speed, means high speed.
5. Compressor State Display “COMP. 1 2 3 4”.
6. Electromagnetism Valve Display “EMV. 1 2 3 4 5 6”.
7. 4-Ways Valve Display

.
8. Defrost Display “Defrost”.
9. Oil Return Display “OIL RETURN”.
10. Page 0 displays the consumption of electric energy with: “ELECTRIC ENERGY kW/h” and the number.
11. Page1 displays the input power frequency with Frequency Hz and the number.
12. Page2 displays the total number of indoor units.
13. Page3 displays the temperature symbolic T3 “TEMP. °C”, “T3” and the number.
14. Page4 displays the temperature symbolic T4 “TEMP. °C”, “T4” and the number.
15. Page5 displays the temperature symbolic T6 “TEMP. °C”, “T6” and the number.
16. Page6 displays the discharge temperature of compressor symbolic C1with “TEMP. °C”, “C1” and the number.
17. Page7 displays the discharge temperature of compressor symbolic C2 with “TEMP. °C”, “C2” and the number.
18. Page8 displays the discharge temperature of compressor symbolic C3 with “TEMP. °C”, “C3” and the number.
19. Page9 displays the compressor current symbolic 1 with “CURRENT A”, “1” and the number.

20. Page10 displays the compressor current symbolic 2 with “CURRENT A”, “2” and the number.
21. Page11 displays the compressor current symbolic 3 with “CURRENT A”, “3” and the number.
22. Page12 displays the digital capacity with “DIGITAL CAPACITY” and the number.
23. Page13 displays the openness of electromagnetism valve symbolic 1 with “VALVE OPENNESS”, “1” and the number.
24. Page14 displays the openness of electromagnetism valve symbolic 2 with “VALVE OPENNESS”, “2” and the number.
25. Page15 displays the most advanced malfunction with “MALFUNCTION” and the code.
26. Page16 displays the most advanced protection with “PROTECTION” and the code.

Note:

- *The page will increase or decrease by 1 every time you press “PAGE UP” or “PAGE DOWN”*
- *Select the online outdoor unit by pressing the “previous” or “next” freely.*

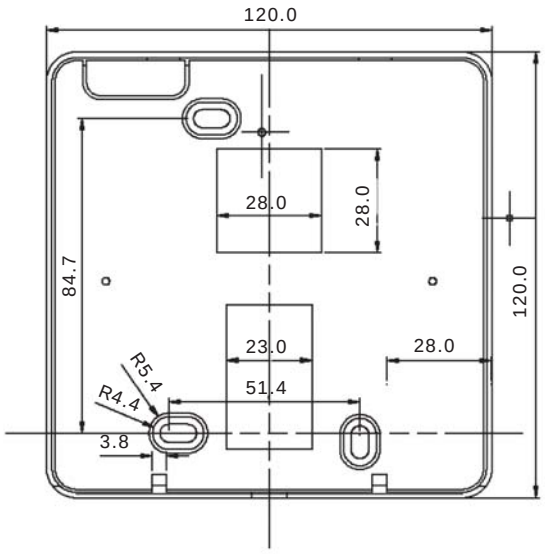
Set Page Display:

1. Set Page Displays “set”;
2. Mode display: Press MODE button, and select Forced Cooling or OFF mode;
3. Set page displays the addresses of selected outdoor unit and module;
4. Press OK button to confirm all settings and send the signals to the corresponding air conditioners.
5. “successful” or “unsuccessful” will be displayed in the display panel to show whether the signals are accepted or not.

Installation of TOCCW001A

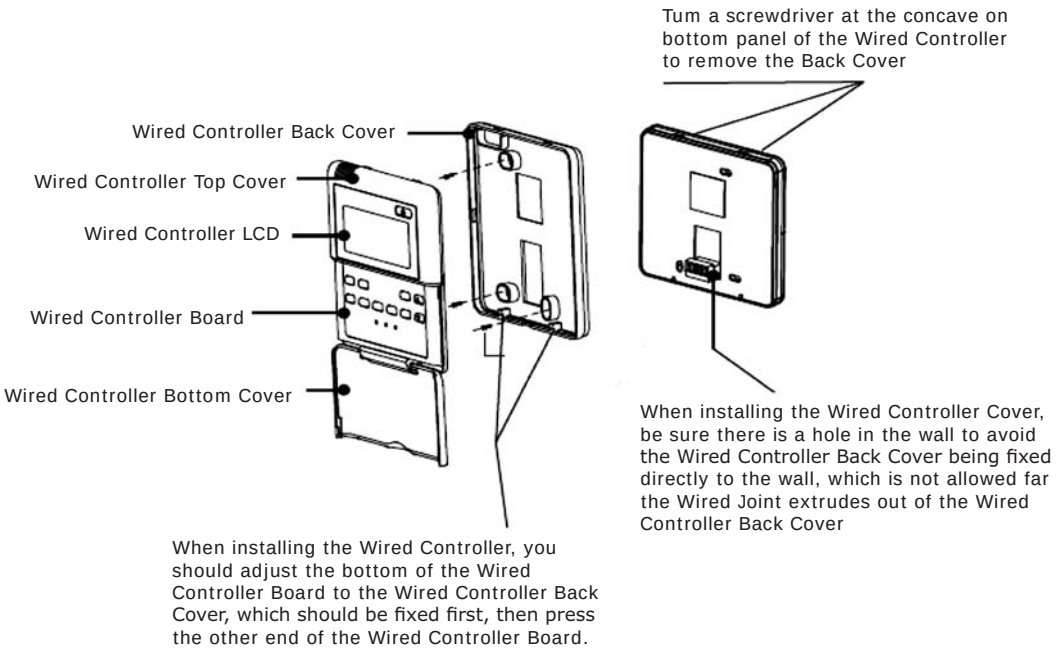
Dimensions: 120×120×15mm

Figure 82



Structure and Composition

Figure 83

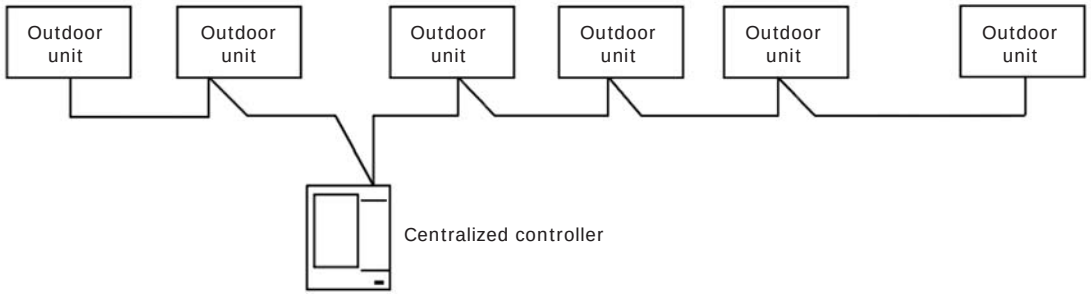

Tum a screwdriver at the concave on bottom panel of the Wired Controller to remove the Back Cover
Wired Controller Back Cover
Wired Controller Top Cover
Wired Controller LCD
Wired Controller Board
Wired Controller Bottom Cover
When installing the Wired Controller Cover, be sure there is a hole in the wall to avoid the Wired Controller Back Cover being fixed directly to the wall, which is not allowed far the Wired Joint extrudes out of the Wired Controller Back Cover
When installing the Wired Controller, you should adjust the bottom of the Wired Controller Board to the Wired Controller Back Cover, which should be fixed first, then press the other end of the Wired Controller Board.

Wiring sketch map of TOCCW001A and outdoor units

These 2 ways are both available

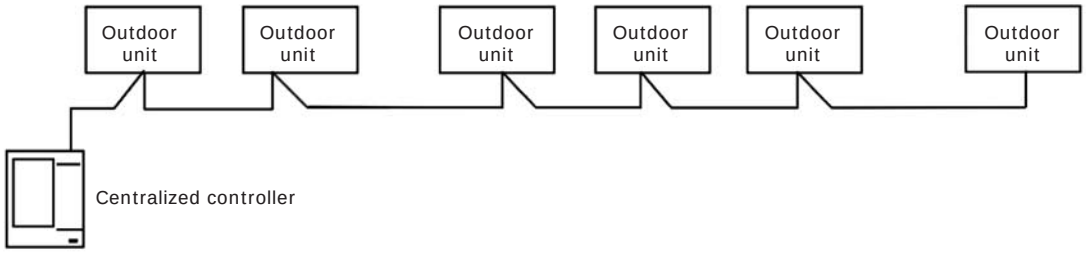
1st way:

Figure 84



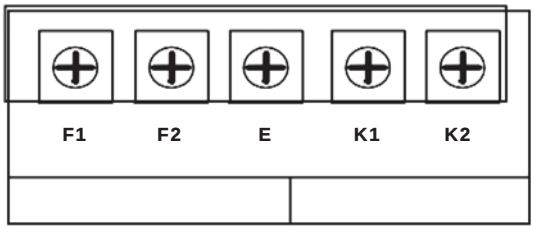
2nd way:

Figure 85



The TOCCW001A wiring ports are as follows.F1, F2, E joints are used for PC connection. K1, K2, E joints are used for outdoor unit connections. E joint is the common terminal.

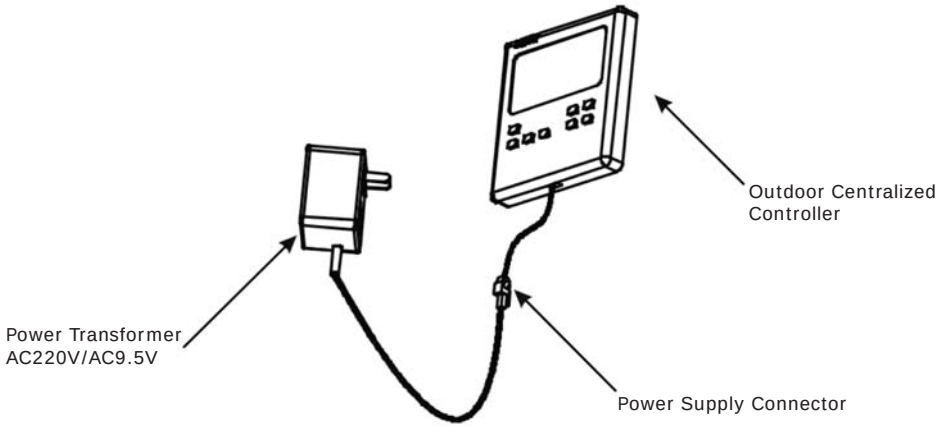
Figure 86



Power supply

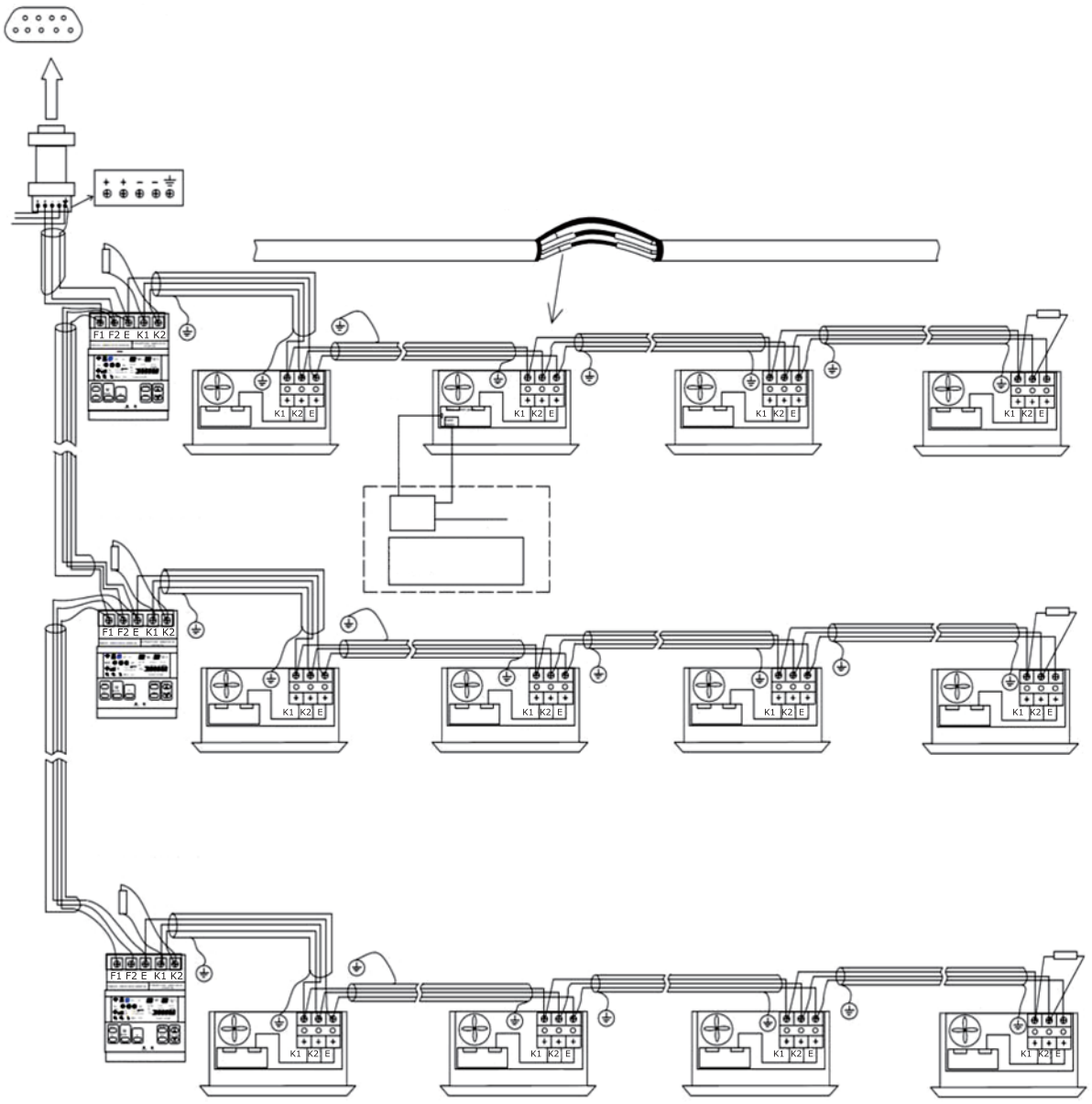
TOCCW001A uses a power adaptor to obtain power supply from the normal AC220V. Remember to connect the adaptor's connector.

Figure 87



Wiring Sketch Map of Building Network Air-conditioning System.

Figure 88



Note:

- *One computer can connect 16 outdoor centralized monitor*
- *One outdoor central monitor can connect 32 outdoor units*
- *You need connect resistors 120Ω in the start and end of each"K1, K2, E"net.*
- *Communication wire masking end assure reliable grounding*

Remarks

- In the wiring, the part from RS485 to RS232 is only needed when connecting with PC. And one PC can connect maximum 16 outdoor TOCCW001A and 16 indoor TMCCW001A. The addresses of TMCCW001A range from 0 to 15, while the TOCCW001A from 16 to 31.
- One outdoor centralized monitoring TOCCW001A can connect maximum 32 outdoor units, while one indoor TMCCW001A can connect maximum 64 indoor units.
- The address of outdoor centralized controller and the address of outdoor units are set manually. Please refer to the user manual for setting.
- **Query and error codes**

  Press QUERY button to start the query function. Then press the PREVIOUS and NEXT buttons to select the outdoor unit that we want to check. Press the PAGE UP button 15 times to display the corresponding outdoor unit's error code or 16 times to display the protection code.

Wire controller TMCCW004A and TMCCW005A

The only difference between TMCCW004A and TMCCW005A is their cabinet's shape. Their controlling functions are totally the same.

Figure 89

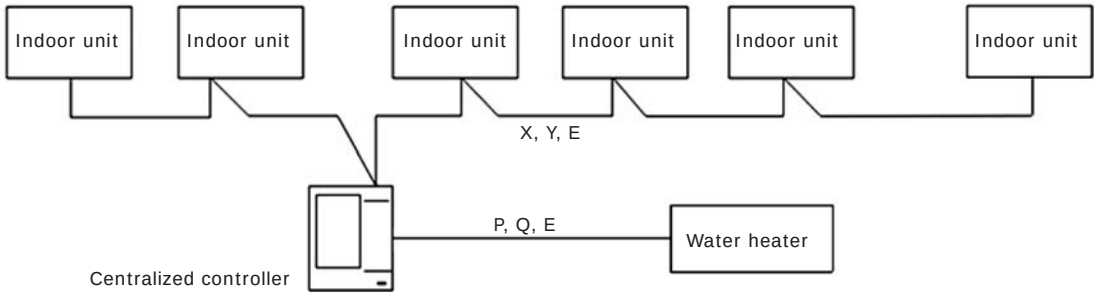
- Newly designed centralized controller with graceful appearance.
- Able to centralized control up to 16 indoor units, of which group can contain 1 fresh air indoor unit.
- Able to control the heat pump water heater.

- **System configure**

  With TMCCW004A, we are able to centrally control up to 16 indoor air conditioner units and 1 heat pump water heater. When the centralized control function works, it acts like the TMCCW002A. TMCCW004A and TMCCW005A are unable to connect the indoor units to the PC or BMS. These 2 ways for the centralized controller to connect the indoors units are both available

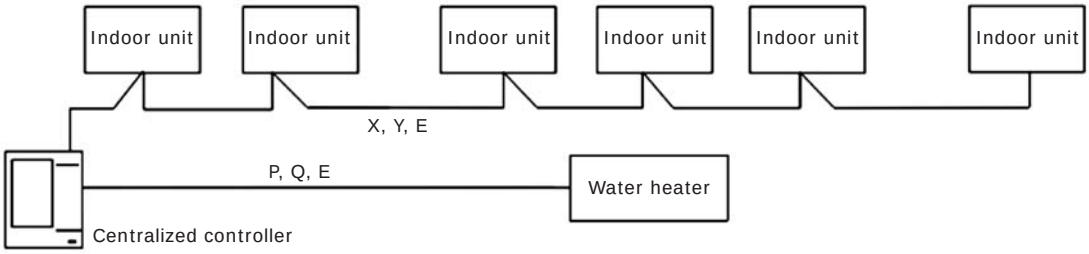
1st way:

Figure 90



2nd way:

Figure 91



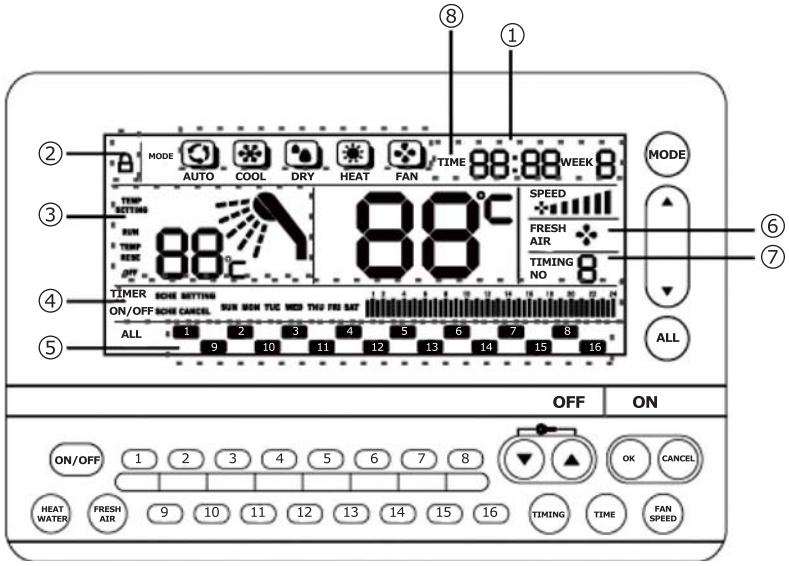
Be noted to the following issues to establish a steady network.

- The signal wire should be 3-core shielded wire and the wire should be provided by licensed electricians.
- To make signal transmission steady and to protect the facilities, the signal transmission wires should not be near to the power line. An interval of 300mm-500mm should exist between these two kinds of wires.
- The signal wire of each network should be less than 1,200m.
- The unit and the centralized controller should be connected hand-in-hand, which means that all the units' same port should be connected to a 3-core wire and the signal wire should be linear in topology. Otherwise, the facilities could not work normally.

- **Description Name and Functions**

  Liquid Crystal Display:

Figure 92



① The current time and date display

Display the date and the time.

② Operation lock display

Display whether the item is locked or not.

③ Displays water heater area

Display the working status of the water heater.

④ Displays event content settings

Display the content of the schedule.

⑤ Displays operating status of the air-conditioner

Display whether the air-conditioner is running: LCD will be illuminated when the corresponding unit is running, or flash slowly if not.

⑥ Timing sequence

Display the timing sequence when setting the events.

⑦ Display the state of the fresh air

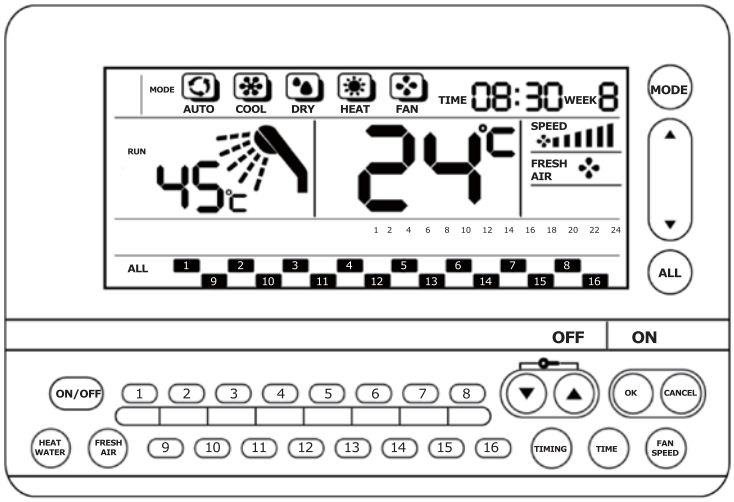
Display the current work state of the fresh air handling unit.

⑧ Display the set temperature of the air-conditioner

Display the current setting temperature of the corresponding air-conditioner.

Keys and functions:

Figure 93



Mode button:

Press this button to change the indoor unit's running mode. The changing sequence of the mode is as follows, Auto/Cool/Dry/Heat/Fan.

Temperature setting button:

Press this button to adjust the setting temperature.

ALL button:

Press this button to select all the indoor units.

ON/OFF button:

This button is used for turning on or off the water heater of the fresh air unit. The operation takes effect after pressing the OK button.

OFF button:

Turn off all or one single air-conditioner.

ON button:

Turn on all or one single air-conditioner.

FRESH AIR button:

Press this key to select the fresh air unit. And then we can change the setting of the fresh air unit.

TIME setting button:

Press this key to activate the time setting function.

OK button:

Press this button to confirm all the settings and deliver the signal the commands to the indoor units.

Water heater button:

Press this key to select the water heater. And then we can change the setting of the fresh air unit.

TIMING button:

Press this button to start setting the turning on and turning off schedule of the indoor unit.

UP and DOWN button:

Used for adjusting the setting temperature the air conditioner and the water heater. Users can lock or unlock the keyboard by pressing the 2 keys synchronously.

CANCEL button:

Cancel the setting operation.

A single air-conditioner selection button:

Use this button to select the corresponding air conditioner.

FAN SPEED button:

Press this button to change the fan's running speed.

- **Installation**

Dimension:

TMCCW004A:180×122×69mm

TMCCW005A:180×122×69mm

Upper Shell

Figure 94

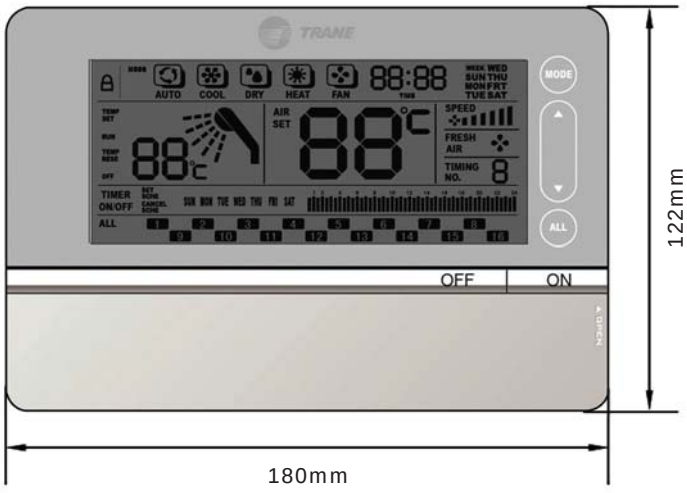
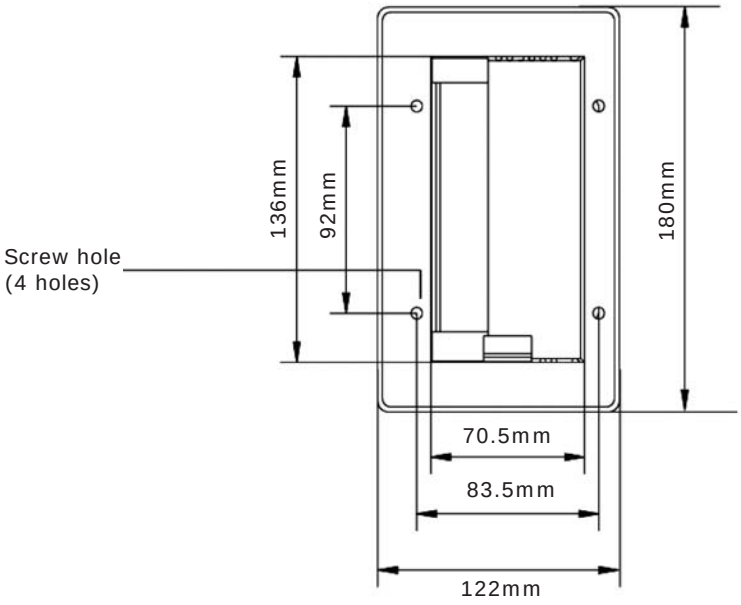


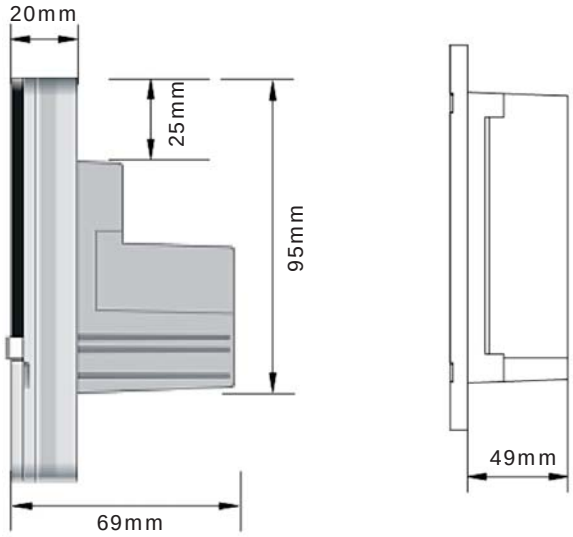
Figure 95



Base cabinet:

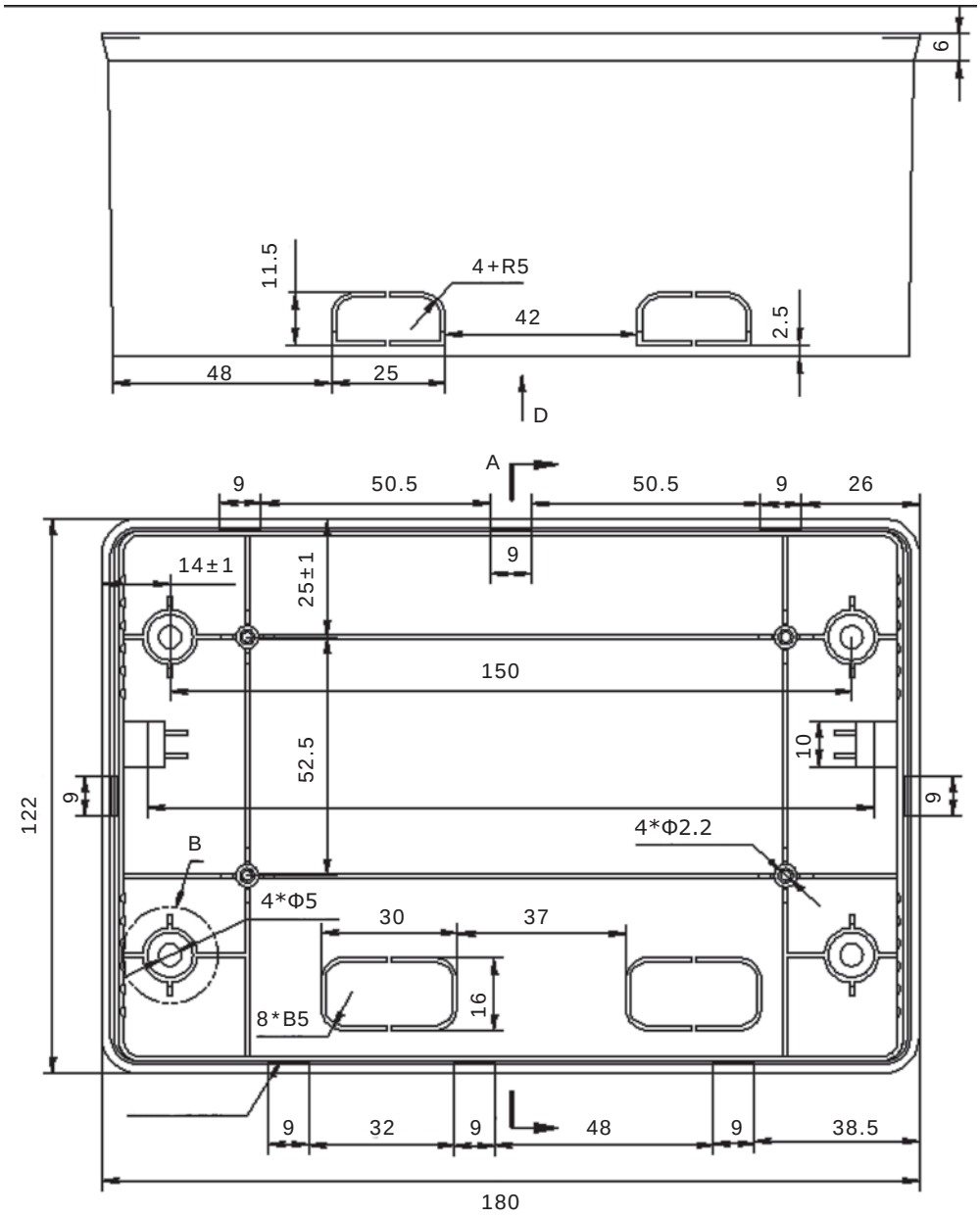
TMCCW004A

Figure 96



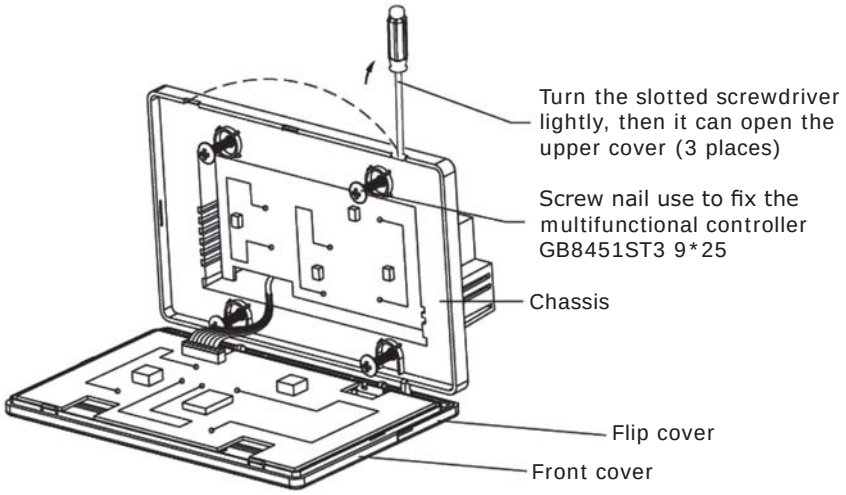
TMCCW005A

Figure 97



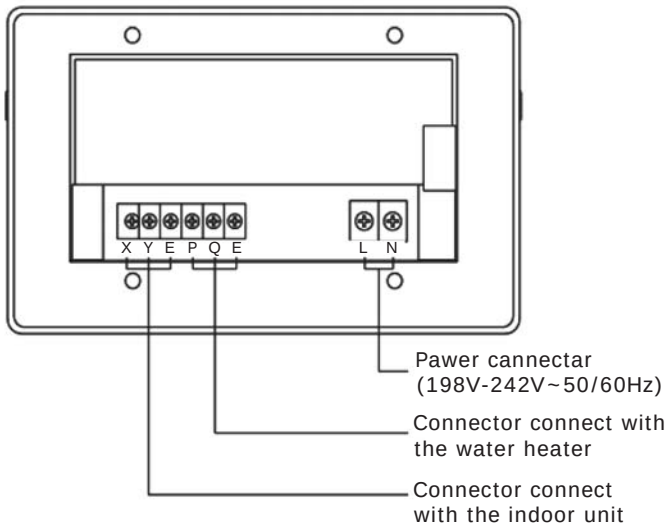
Detaching the shell

Figure 98


Turn the slotted screwdriver lightly, then it can open the upper cover (3 places)
Screw nail use to fix the multifunctional controller GB8451ST3 9*25
Chassis
Flip cover
Front cover

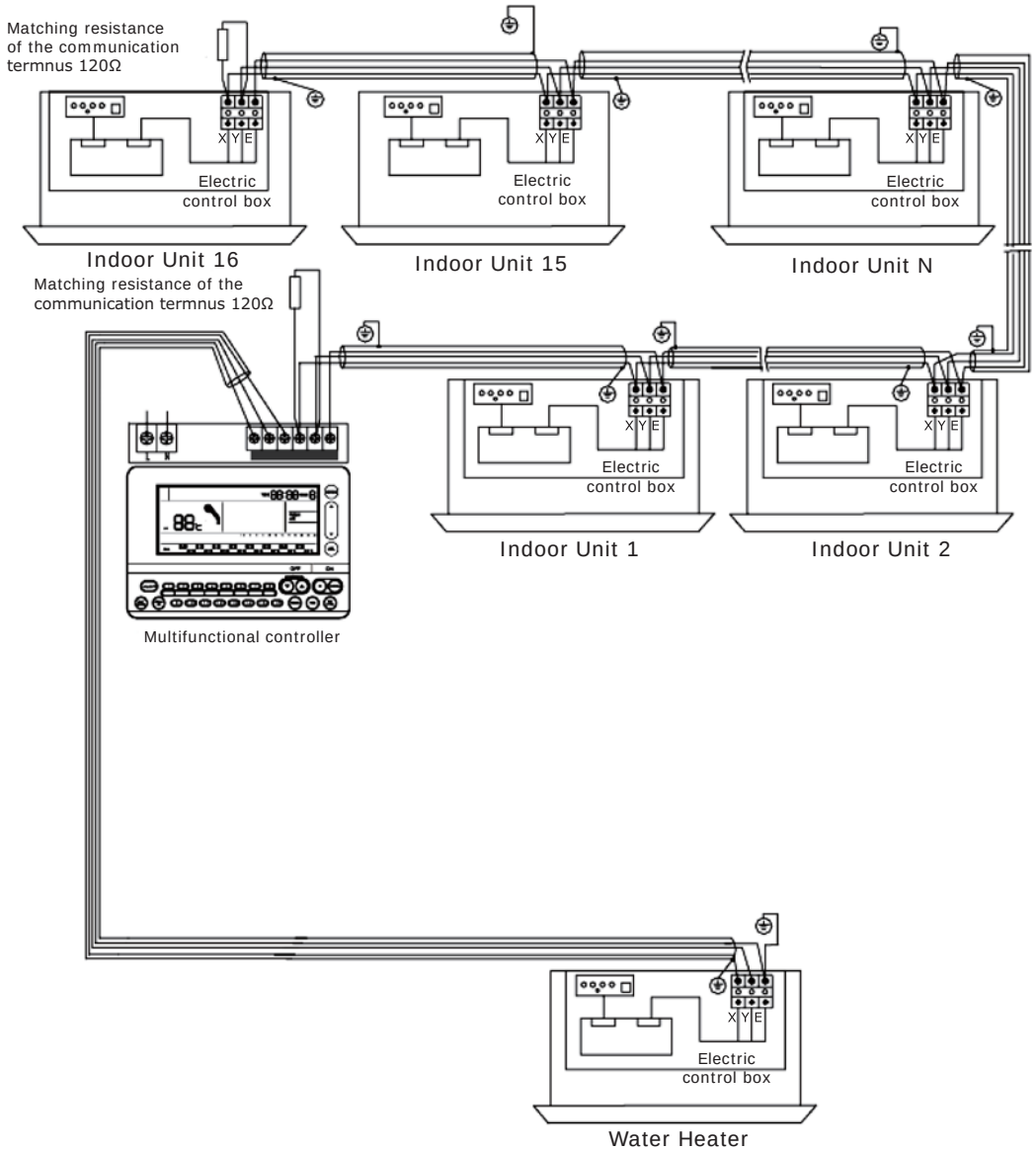
Wiring at the back

Figure 99


X Y E P Q E
L N
Pawer cannectar (198V-242V~50/60Hz)
Connector connect with the water heater
Connector connect with the indoor unit

Available wiring diagram

Figure 100



- **Error and Diagnosis**

  1. If the centralized controller can not detect the indoor units,and does not display the icons 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16. Check the wiring from the malfunction indoor unit to the controller.Please make sure that the joint are tied steadily and the wiring obeys the hand-in-hand rule.
  2. If the centralized controller can not detect the water heater and nor display the shower icon, then check whether the P, Q, E of the controller is connected to the communicative line X, Y, E of the water heater correctly. If not, it would not display the shower icon.

Note:

TMCCW004A or TMCCW005A does not display the error code of the indoor unit.

Mode Lock Controller TMCCW006A

TMCCW006A is a wired centralized mode lock controller. With this device, we could lock the mode of all the units connected to this controller to avoid mode conflict. When the mode conflict happens, e.g. malfunction would be caused. By adopting this device, we could consider the environment and artificially determine whether the indoor units should work at cooling or heating mode.

Figure 101

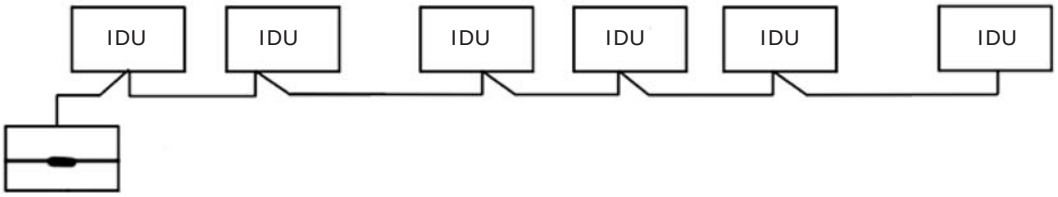
- New designed and graceful appearance
- Compactly functions and friendly user interface
- Easy networking
- Connect up to 64 indoor units

- **System configure**

  Mode lock controller TMCCW006A is only a compact indoor unit centralized controller, which cannot bridge the indoor units to the PC or BMS. Its network configuration is much the same as TMCCW002A. The following 2 ways is both available.

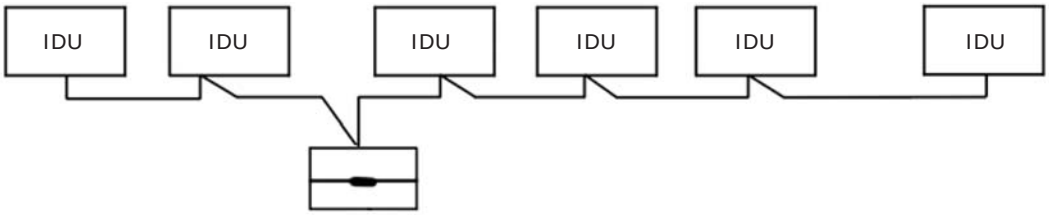
  1st

Figure 102



2nd

Figure 103



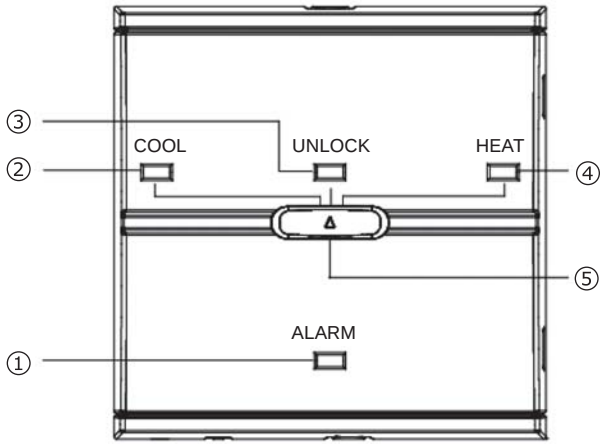
Be noted to the following issues to establish a steady network.

- The signal cable and power cable of the central controller cannot be contained in the same cable tube. The distance between the signal cable tube and power cable tube shall be between 300mm-500mm at least.
- The total signal cable length of the central controller shall not exceed 1,200m.
- Make sure there is no joint in the middle of the shielded cable.If such a joint exists, use a socket to connect it.

- **Descriptions of the functions of each button**

  Buttons and indication lights

Figure 104



1. **Alarm light**

   This indicates malfunction of the unit. After detecting the error and solving the problem, the ALARM light will fade out.

2. **COOL light**

   Push the mode switch leftwards to turn all the indoor units to cooling only mode and the COOL light will be on. This light indicates that all the indoor units are running at cooling mode. Users can only set the cooling parameter such as temperature and fan speed by other controller. If the user changes the units to the heating only mode, mode conflict would be caused. In this case, the unit will be shut off automatically to prevent further damage.

3. **UNLOCK light**

   Press the mode switch to the middle of the controller and the UNLOCK light will be on.In this mode, all the indoor units are free to work either in cooling or heating mode.

4. **HEAT light**

   Press the mode switch leftwards to turn all the indoor units to heating only mode and the HEAT light will be on. This light indicates that all the indoor units are running at cooling mode. Users can only set the heating parameter such as temperature and fan speed by other controller. If the user changes the units to the cooling only mode, mode conflict would be caused. In this case, the unit will be shut off automatically to prevent further damage.

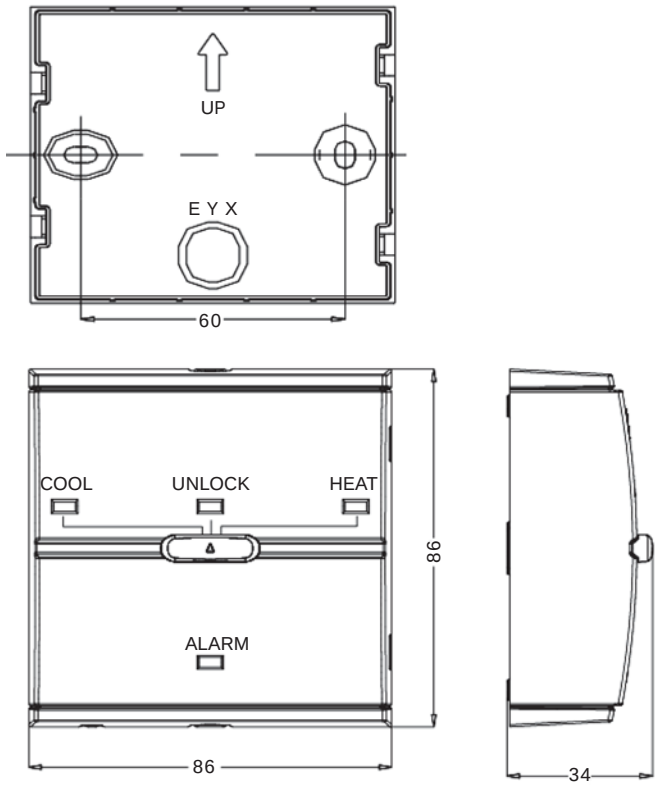
5. **Mode switch**

   Mode switch is the only key on the controller. Slide this key and command all the indoor units to the corresponding mode to avoid mode conflict.

- **Installation**

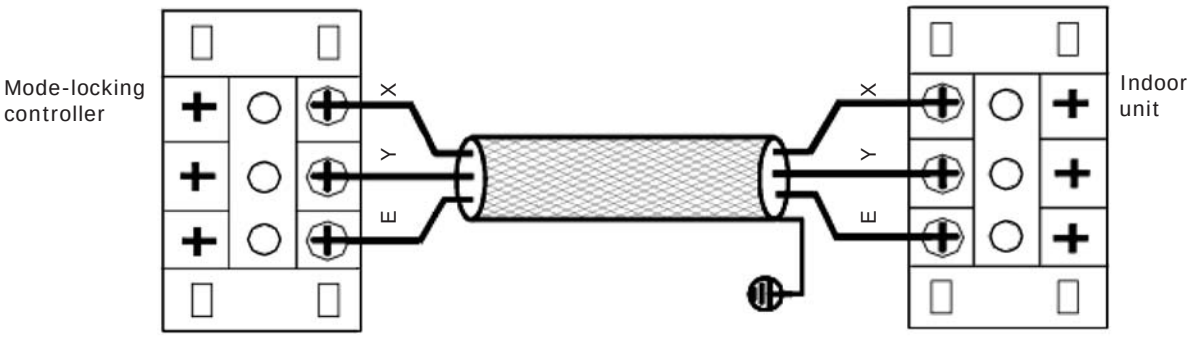
  Dimension

Figure 105



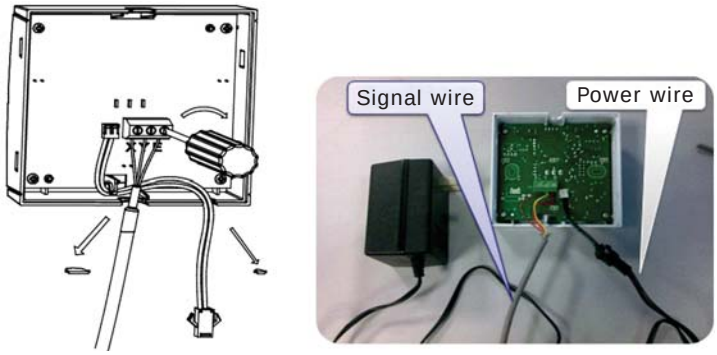
Controlling wiring connection

Figure 106



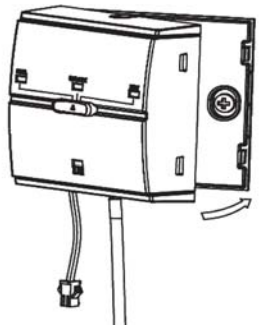
Tie the screw

Figure 107



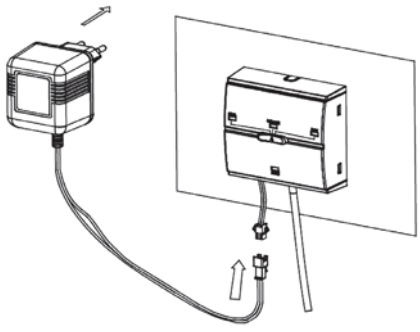
Assemble the front shell to the base

Figure 108



Connect the power adaptor to the controller

Figure 109



The power supply of the TMCCW006A should be 220-240V 50/60Hz.

Summary:

Table 46

Comparison of remote controllers

	TMCCW001A	TMCCW002A	TMCCW003A	TMCCW004A TMCCW005A	TMCCW006A	TOCCW001A
Time display	—	—	—	•	—	—
Keyboard locking	•	•	—	•	—	•
Querying	•	•	—	•	—	•
Swinging	•	•	—	•	—	—
Error code display	•	•	—	•	—	•
Error code light	—	—	•	—	—	—
Backlight	•	•	—	•	—	—
Schedule	—	•	—	—	—	—
FOLLOW ME	—	—	—	—	—	—
Fan control	•	•	—	•	—	—
Mode selection	•	•	•	•	•	—
Auto-start	•	•	—	•	—	—
Mode lock	•	•	—	—	•	—
Address equipped	•	—	—	—	—	•
Bride to gateway	•	—	—	—	—	•
Max.units	64	64	16	16	64	32

Note:

RS485 is the very communicative way that our units use. In one complete system, several RS485 networks are built in side. For example, all the P, Q, E terminals compose a RS485 network, and all the X, Y, E compose another. So is the K1, K2, E, and the F1, F2, E ones. Each RS485 network should be connected in the hand-in-hand way. The different RS485 networks are separate.

Network Control System

Table 47

Controller	Model	Description
Building gateway	TSNCA002A	Building gateway connects to BACnet network for integrating to other BMS to realize air-conditioning management and control. It is free from any need to match Trane network system and PC.
Building gateway	TSNCA001A	Connect VRV to BMS via LonWorks. Other system such as those for fire and crime preventions, can be easily interlocked with Trane's unit.
Network control software	TSNSA001A	The network control software with Firebird data. Add network fee charge function and connect the outdoor unit centralized controller based on the No.2 generation network central control system. It may connect to 16 indoor unit centralized controller and 1,024 indoor units, and also connect to 16 outdoor unit centralized controller and 128 refrigeration systems.

Building gateway TSNCA002A

TSNCA002A is a gateway to connect the indoor units and outdoor units to the BACnet. BACnet stands for the Building Automation and Control Network. TSNCA002A gathers the information of the IDU and ODU. Besides, TSNCA002A is able to send the command to the units.

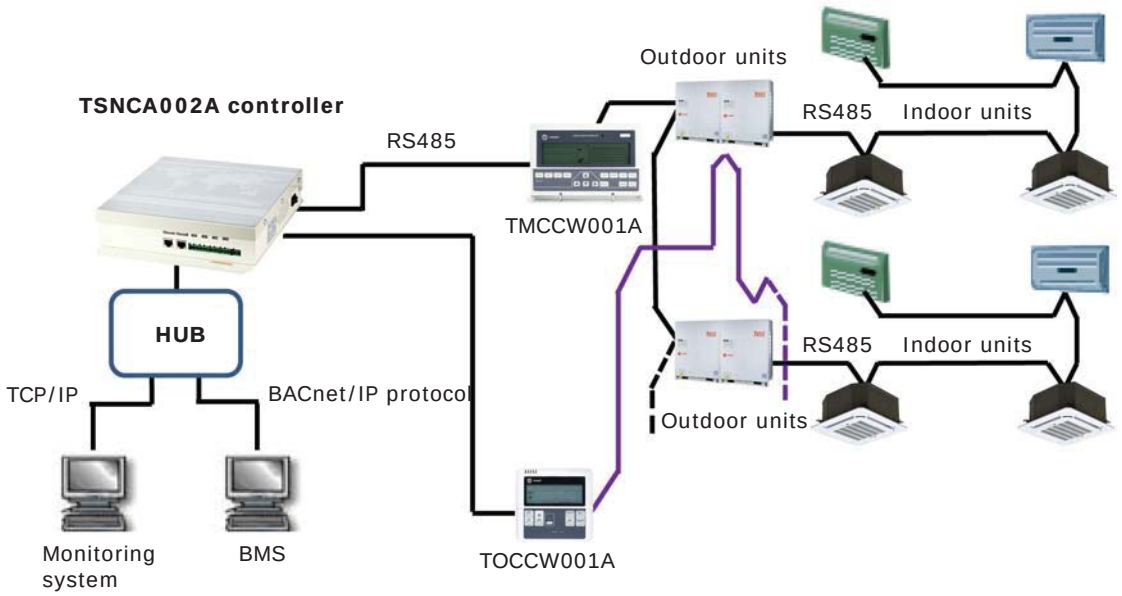
Figure 110

- Be able to bridge the indoor and outdoor units to the BACnet protocol BMS.
- Also be able to connect the indoor and outdoor units, without the BMS.
- Contains 4 Groups of RS485 communication ports and connect up to 256 indoor units or 128 outdoor units.
- User can check the units' status and change their settings via local network.
- Compatible with Firebird.

- **System configure**

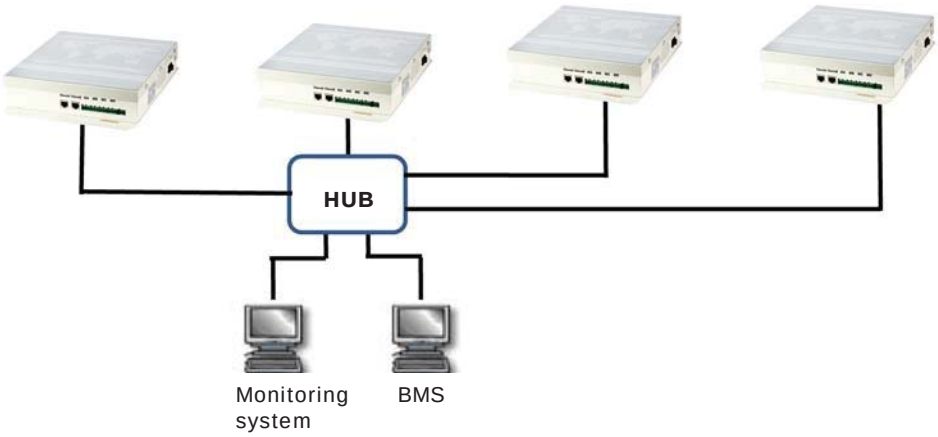
TSNCA002A is able to connect up to 4 groups of RS485 communicative network. Each of the RS485 networks contains up to 64 indoor units or 32 outdoor units. The input of TSNCA002A should be directly connected to the TOCCW001A or TMCCW001A.

Figure 111



If there are a few TSNCA002A applied in the system, the TSNCA002A can be connected to the HUB and then connected to the monitoring system and BMS.

Figure 112

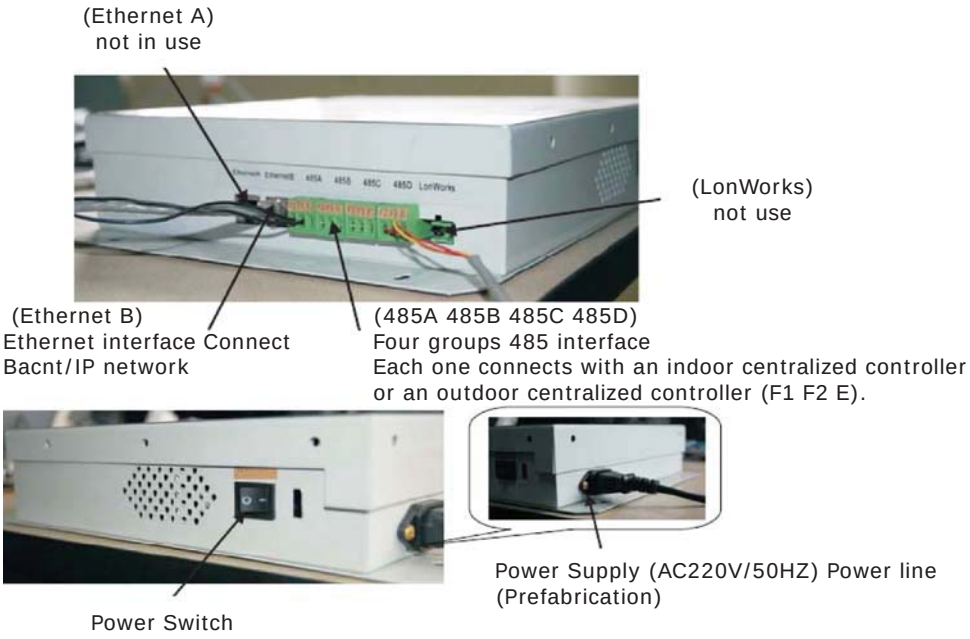


Note:

TSNCA002A and the BMS computer must be at the same subnet address field. Otherwise, the device cannot work normally. The default address of TSNCA002A is set to be under the segment "192.168..*".*

- **Connecting ports and functions**

Figure 113



TSNCA002A has some kinds of connecting ports. Ethernet A and LonWorks ports are used for further function designed and do not function by now.

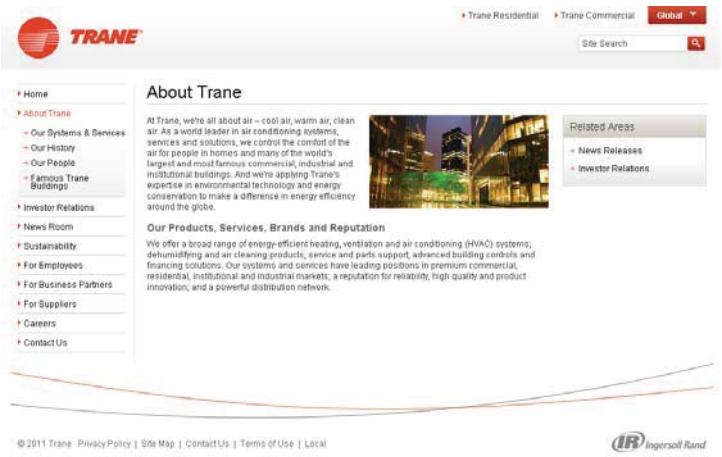
Ethernet B: port is an Ethernet interface base on the BACnet network protocol. Connect this port with the BACnet HUB, then the device connected to the HUB can communicate with the TSNCA002A.

485A-485D: 4 groups of RS485 communicative port. Each port can be connected to a TOCCW001A or TSNCA002A via the “F1, F2, E” terminals.

- **WEB access**

TSNCA002A can offer web service, which allows users access to the gateway from the local computer network. Type the address of TSNCA002A in the explorer’s address field and users can view the TSNCA002A’s connecting status or change the working status of the indoor units. The interfaces are as follows:

Figure 114


TRANE
Trane Residential
Trane Commercial
Global
Site Search
Home
About Trane
Our Systems & Services
Our History
Our People
Famous Trane Buildings
Investor Relations
News Room
Sustainability
For Employees
For Business Partners
For Suppliers
Careers
Contact Us
About Trane
At Trane, we're all about air -- cool air, warm air, clean air. As a world leader in air conditioning systems, services and solutions, we control the comfort of the air for people in homes and many of the world's largest and most famous commercial, industrial and institutional buildings. And we're applying Trane's expertise in environmental technology and energy conservation to make a difference in energy efficiency around the globe.
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Our Products, Services, Brands and Reputation
We offer a broad range of energy-efficient heating, ventilation and air conditioning (HVAC) systems; dehumidifying and air cleaning products; service and parts support; advanced building controls and financing solutions. Our systems and services have leading positions in premium commercial, residential, institutional and industrial markets; a reputation for reliability, high quality and product innovation; and a powerful distribution network.
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Ingersoll Rand

Note:

Users can find the default address in the package. Please modify the address of TSNCA002A and make sure that the address is in the same subnet with the BMS computer before used.

Moreover, the default administrator account to login the TSNCA002A is "Admin", default password "123456".

To save the air conditioner's running data, an SD card is needed but not included in this product. Users can purchase one from the market. SD cards of different volume can save different periods of running data. Normally an SD card of 1 GB is able to save the data of more than 1 year.

- **Available BMS**

TSNCA002A has a wonderful adaptability to the BMS. It can be connected to many company's building management system software. We can get the mainly supporting BMS information from the table bellow:

Table 48

NO.	Company	BMS software	Brand
1	SIMENS	APOGEE	
2	TRANE	Tracer Summit	
3	Honeywell	Alerton	
4	Schneider	Andover	
5	Johnson	METASYS	

Building gateway TSNCA001A

TSNCA001A is a gateway to connect the indoor units and outdoor units to the LonWorks network. TSNCA001A helps other LonWorks devices gather the information from the Trane central A/C, and help setting the indoor units' working mode. Compared with the TSNCA001A TSNCA002A needs a computer and the monitoring software.

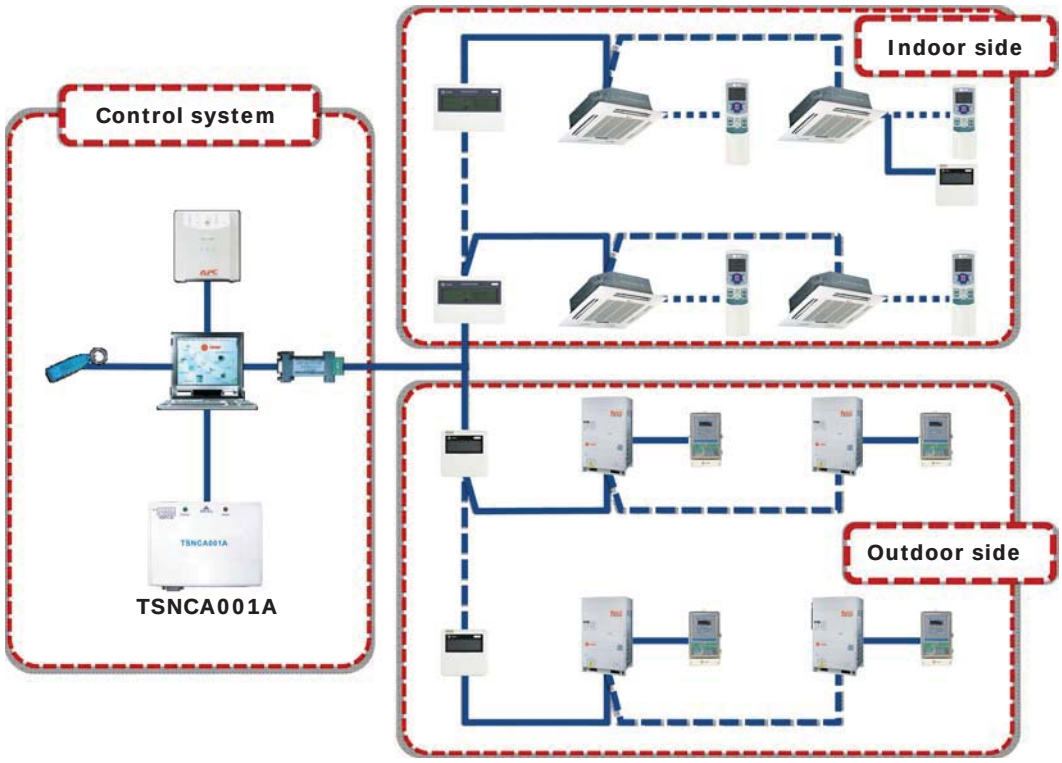
Figure 115

- Connect Central A/C system to LonWorks network.
- The core control module applies flash memory, which could easily download the program on line.
- TSNCA001A applies nonpolar twisted pair lines, which makes connecting to LonWorks network easily.

- **System configure**

  TSNCA001A is a gateway from the network control software to the LonWorks, which can gather all the units' information and control the indoor units. As a result, the indoor and outdoor units need firstly connecting to the computer to make a central monitoring system. The composition of the whole network is as follows:

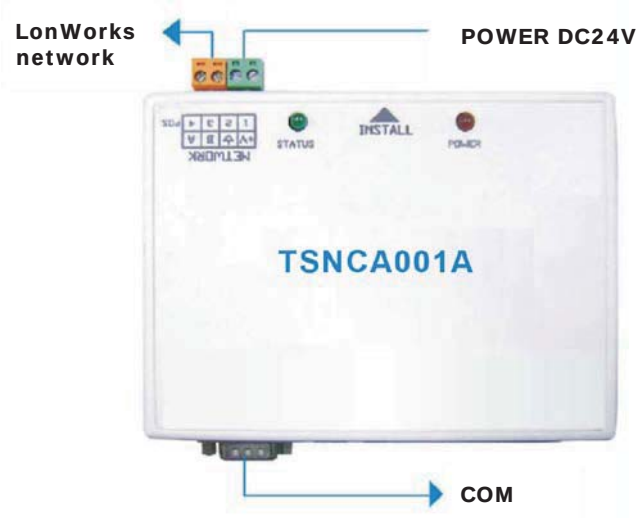
Figure 116



If there are a few TSNCA001A devices to compose a LonWorks network, the LonWorks terminals of the TSNCA001A are able to be connected in the hand-in-hand way.

- **Connecting ports and functions**

Figure 117



COM port: This port should be connected to the computer's COM port, using the RS232 communicative standard.

LonWorks: This port uses a removable connecting way to help user connect the LonWorks network conveniently.

DC POWER: TSNCA001A is an active gateway, so TSNCA001A inquires a power supply of DC 24V. This port should be connected to the DC power adaptor.

Network control software TSNSA001A (Firebird)

Please refer to "installation and operation manual" of "network control software".

Other Accessory

Table 49

Assy.	Model	Description
Digital ammeter	TSNEA002A	Send the electric energy data to outdoor unit for realizing network fee charge function.
Hotel inserting card module	TMNCA001A	Match hotel card system to control the air conditioning.
Room Temperature Management Module	TMNCA002A	Detect any change in infrared radiation by a person or an object.
Mode lock controller		

Digital ammeter TSNEA002A

The digital ammeter TSNEA002A is a device to calculate the power consumption of the outdoor unit and transmit the information when it is required.

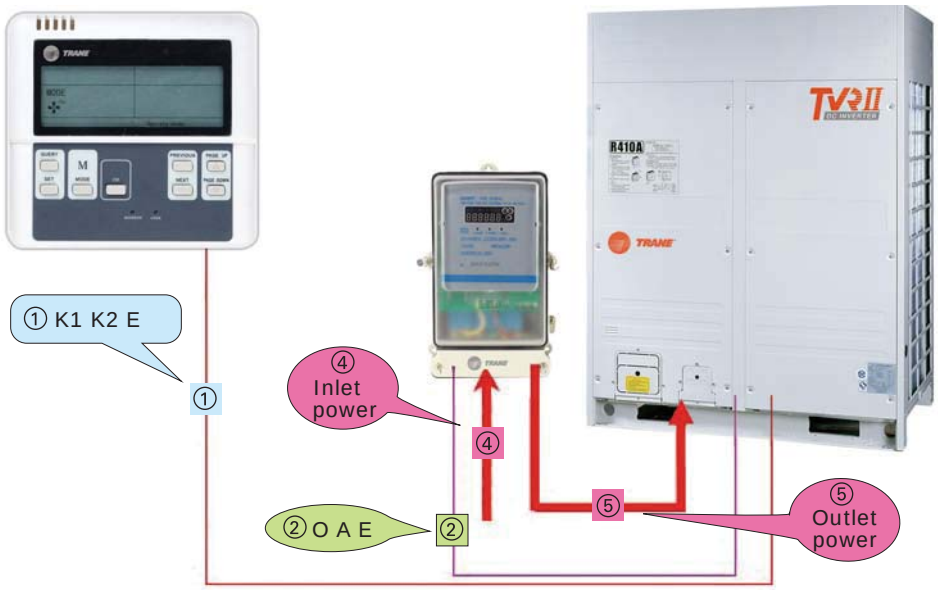
Figure 118

- Function steadily and needs no adjustment.
- In possess of great precision.
- Work in wide working temperature, from -35°C to +55°C.
- Be able to be built inside the outdoor units in the factory

- **Digital ammeter wiring**

The ammeter has two kinds of ports. One is the power port used to calculate the current flow through it. The other is the signal port O, A, E used to send the signals to the other device. Both of these two kinds of port should be connected and fastened before use.

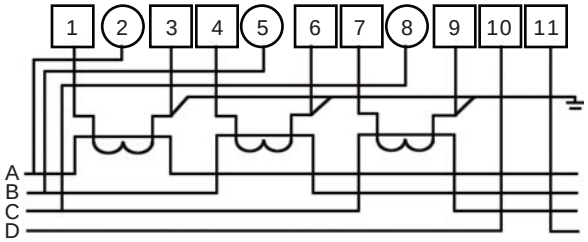
Figure 119



Digital ammeter power line connecting.

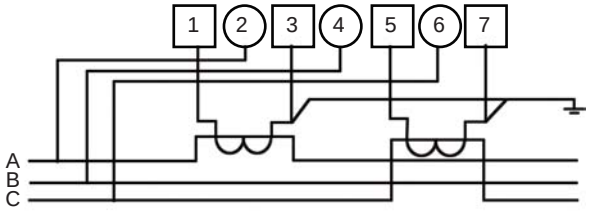
- Three-phase four-wire system with current transformer

Figure 120



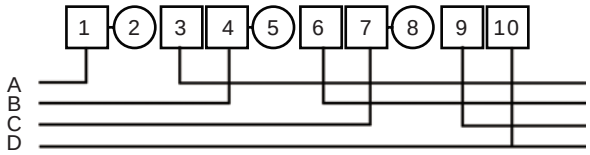
- Three-phase three-wire system with current transformer

Figure 121



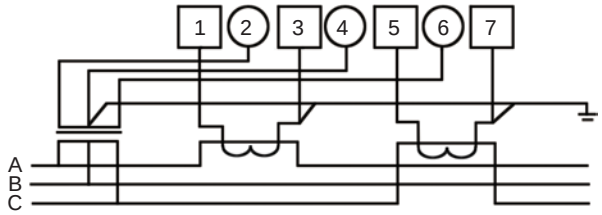
- Three-phase four-wire system

Figure 122



- Three-phase four-wire system

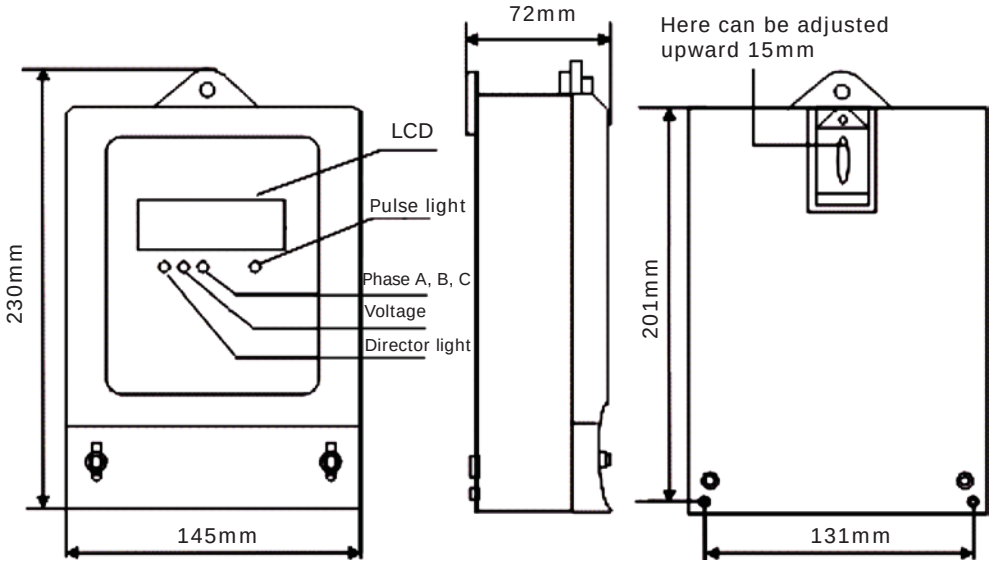
Figure 123



- **Installation**

Dimensions

Figure 124



Note:

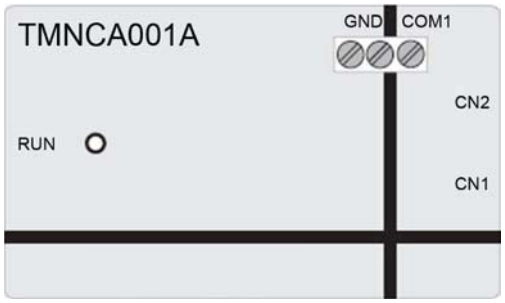
The ammeter device is an optional device. Without this device, the central AC system is also able to work normally.

If users want to realize the network fee calculating function, this device is necessary. Each outdoor unit should be equipped with one one ammeter. Remember to fix the power line terminals and the signal line terminals before use.

Hotel inserting card module accessories TMNCA001A

TMNCA001A is mainly designed for the hotel inserting card system, which offers a smart way to save energy and manage the air conditioners.

Figure 125

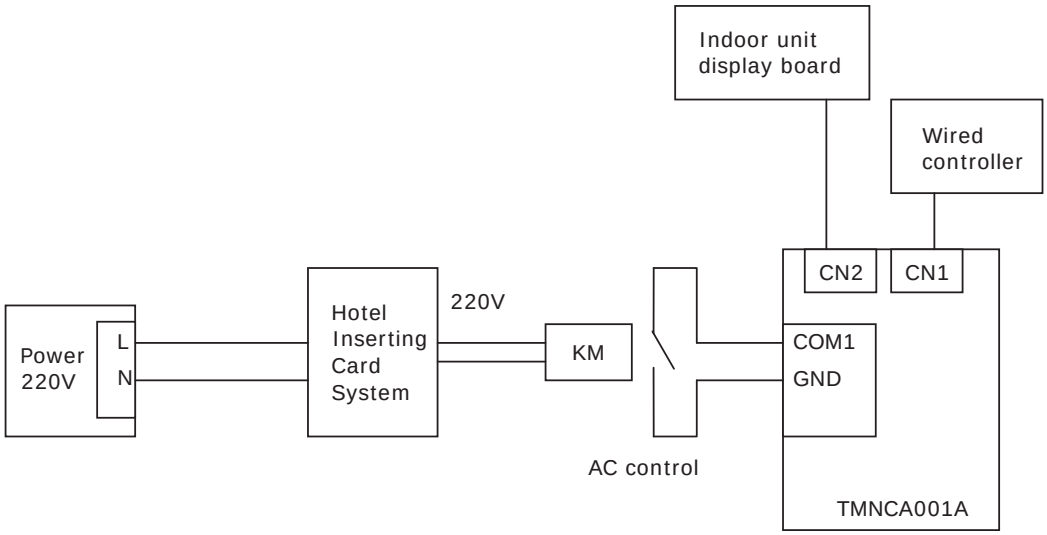


- A smart way to save energy and money.
- Cooperates with the hotel inserting card system.
- Extra power supply is unnecessary.
- Connected but insulate to the inserting card system.
- Easy to install.

- **Wiring**

When the card is inserted, the terminal COM1 and GND should be connected to turn on the unit. So the inserting card system should send the signal to the terminal COM1 and GND. The wiring diagram should be as follows.

Figure 126



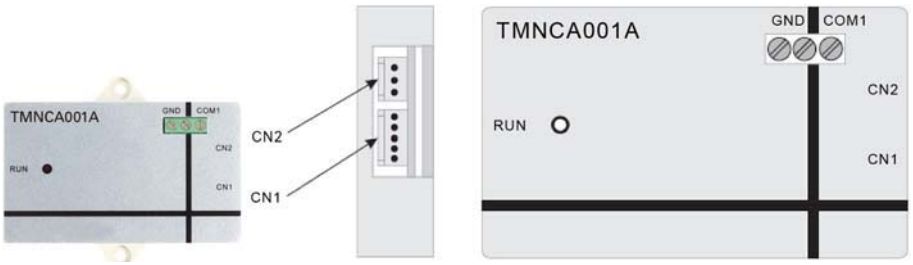
Note:

An AC contactor or a delay is necessary to transform the signal.

Wiring assy. 1 connects the CN1 of hotel inserting card assy. to wire controller of air conditioner.

Wiring assy. 2 connects the CN2 of hotel inserting card assy. to display board and main control board of air conditioner indoor unit.

Figure 127



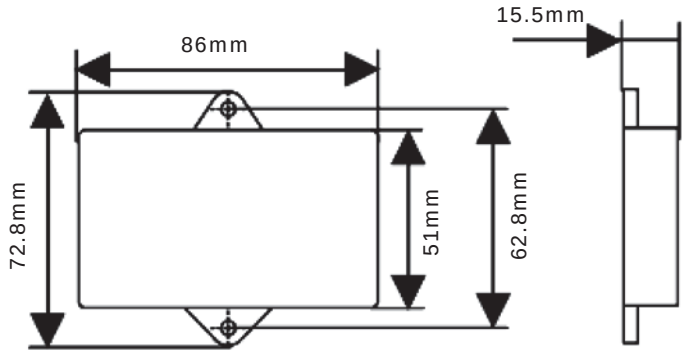
Note:

COM1 and GND terminals should be short to work and not connected to the power. The electricity voltage over 5V will probably damage the device and cause fire.

- **Installation**

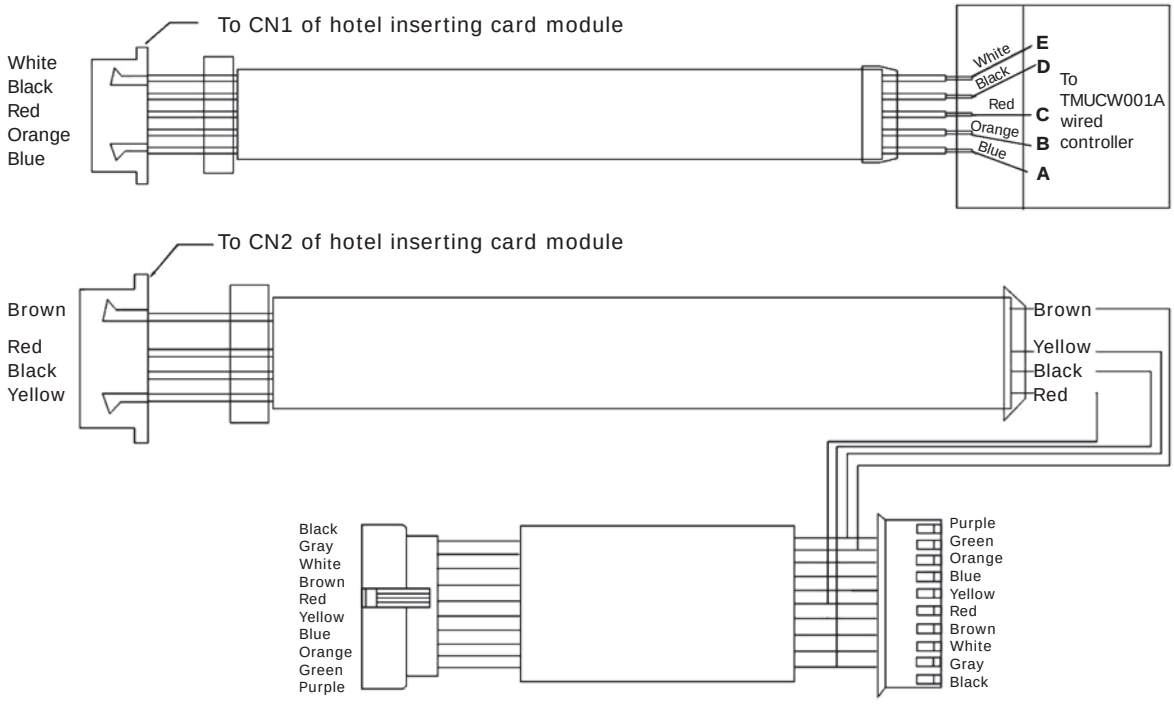
Dimensions

Figure 128



Wires

Figure 129



- **Operation description**

1. Connect 5-place terminal at fixed rated wire controller via 5 terminals: A, B, C, D, E.
2. Connect LCD at main control panel of indoor unit via terminals REV, C, D, E.
3. Upon wiring according to the wiring diagram, please supply power to the wired controller and switch on it. When card has been inserted between in COM1 and GND, air conditioner is turned on and its operation mode could be set, the director lamp at wired controller is light-up.
4. When no card has been inserted between in COM1 and GND (i.e. It is not short connected), the ON/OFF button of wired controller cannot start air conditioner, but two beeps of air conditioner closed down signals will give out and no lamp is light-up at wired controller.
5. User must apply wired controller to turn on air conditioner and set operation modes every time power is input. After that, operation modes of this performance would be memorized, even after re-insert the cared after taking it off as long as power is not cut off from main unit. i.e. The unit will turn off upon the taking-off of the card and it will perform as per the last setting once insert the card again.

   Notice: the first start-up of main unit and mode setting must be set via controller.
6. System can receives signal delivered from fixed rated wired controller (TMUCW001A), and transits the signal to indoor unit; it can also memorizes the latest ON/OFF information sent by wired controller (Timing information will not be transited but memorized.)
7. Once the power is supplied to hotel inserting card module, the unit will transit the default signal as the unit shut down. The system will send the signal of shutdown twice after the card is taken off. The system will not start until 3 seconds after the card is re-inserted, for memory information delivery.

Room Temperature Managemnet Module TMNCA002A

TMNCA002A is a room temperature management module, which is able to detect whether there is people nearby and auto change the air conditioner back to running mode. This humanistic device helps making a comfortable environment for the users and shut down the conditioner automatically.

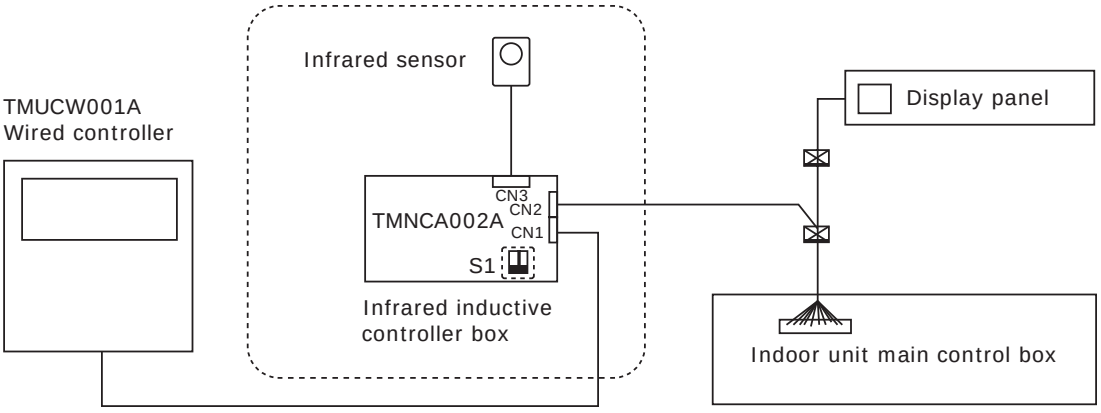
Figure 130

- Be easy to install on the wall or ceiling.
- With a wide detective angle up to 100°.
- Detective distance is at least 4m, with great sensibility.
- Powered from the indoor unit display panel, without any extra power supply.

- **Wiring of TMNCA002A**

The room temperature management module TMNCA002A contains a sensor and a control box. The control box helps connecting the device to the wired controller and the indoor unit.

Figure 131



As show above, the TMNCA002A has 3 connecting ports.

CN1 is used for connecting the wired controller.

CN2 is used for connecting the indoor unit's display panel.

CN3 is used for connecting the infrared sensor.

The switch S1 stands for:

Table 50

ON 1 2	Turn off the indoor units in 1 hour after users leave.
ON 1 2	Turn off the indoor units in 0.5 hour after users leave.
ON 1 2	Reserved.

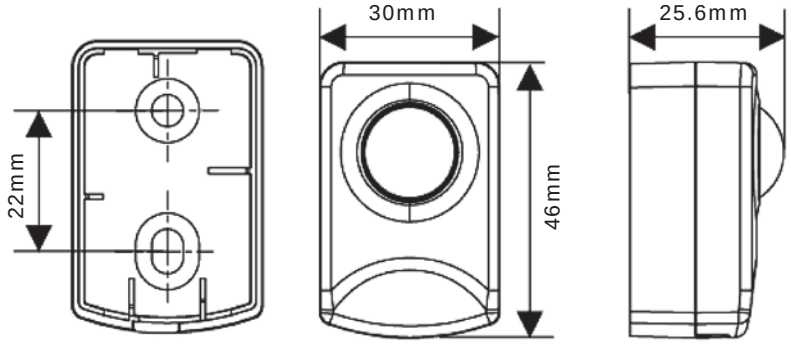
- **How to use?**

The general function of TMNCA002A is to shut down the indoor unit automatically. So users should run the indoor unit firstly and adjust the temperature, fan speed, etc, via the wired controller. Once set, users do not need to turn off the indoor unit. The TMNCA002A will turn it down automatically. Once the users come to the infrared sensor's detective area, the TMNCA002A will turn on the indoor unit automatically and runs at the status which is set previously.

- **Installation**

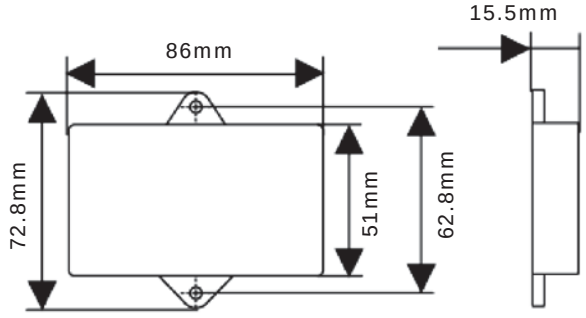
Dimensions

Figure 132



Infrared sensor

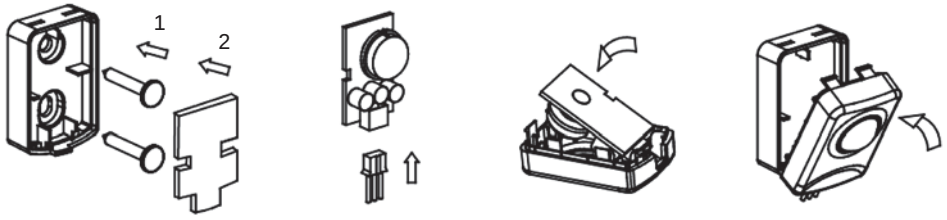
Figure 133



Control box

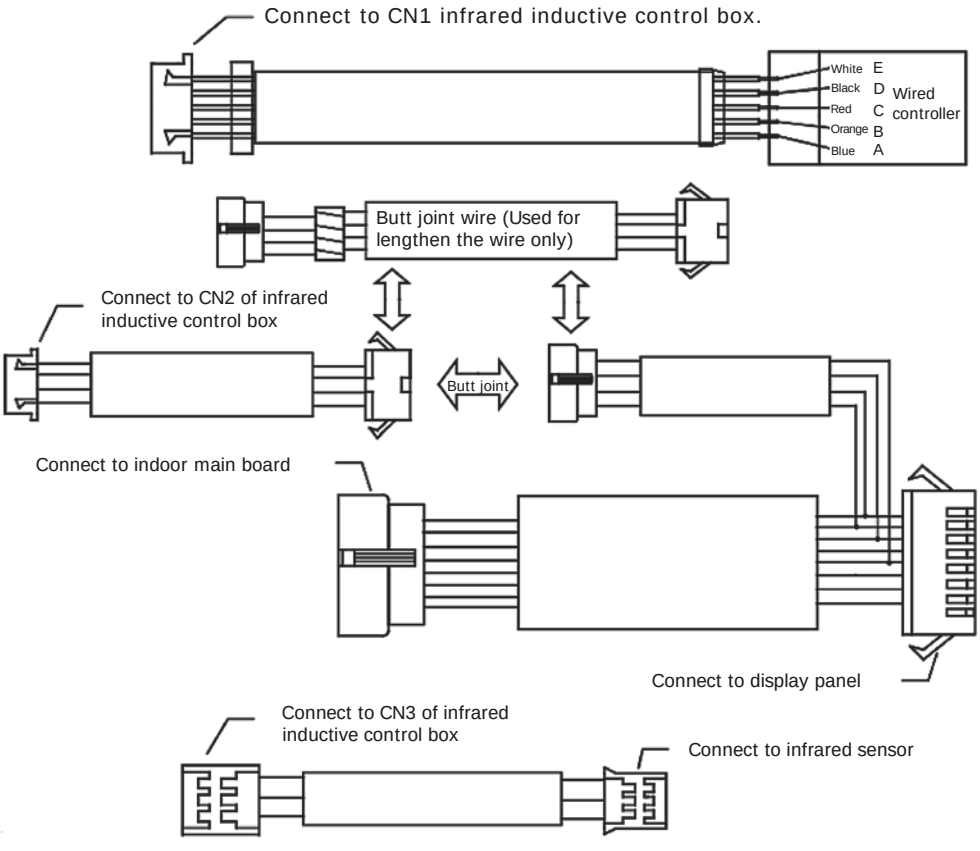
Connecting and Assembly

Figure 134



Wires

Figure 135

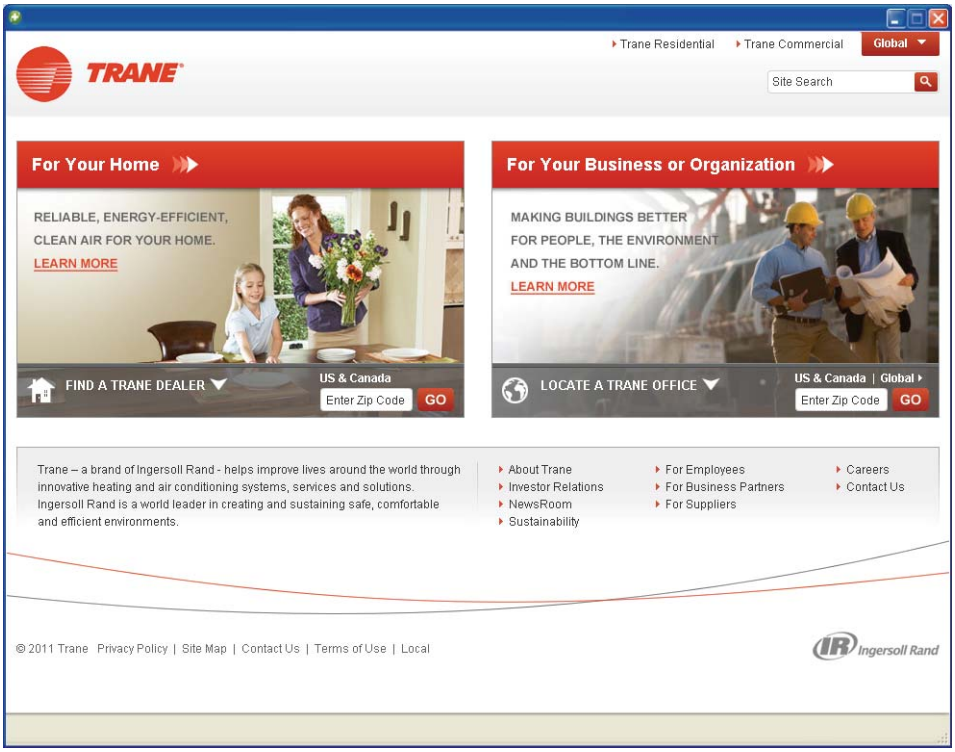

Connect to CN1 infrared inductive control box.
White E
Black D
Red C
Orange B
Blue A
Wired controller
Butt joint wire (Used for lengthen the wire only)
Connect to CN2 of infrared inductive control box
Butt joint
Connect to indoor main board
Connect to display panel
Connect to CN3 of infrared inductive control box
Connect to infrared sensor

- **Computer diagnostic modules and software TSNSA002A**

TSNSA002A is remote diagnostic software, which is able to inquire the outdoor unit's running status and make the running charts. This software takes advantage of the outdoor unit's K1, K2, E terminals.

As a result, the centralized controller TOCCW001A is unable to connect to the outdoor units and unable to work with the network monitoring software.

Figure 136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Please refer to "installation and operation manual" of the "Trane Outdoor Unit Diagnostic Software Manual".

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VRF-SVM33A-EN 10 Feb 2012
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